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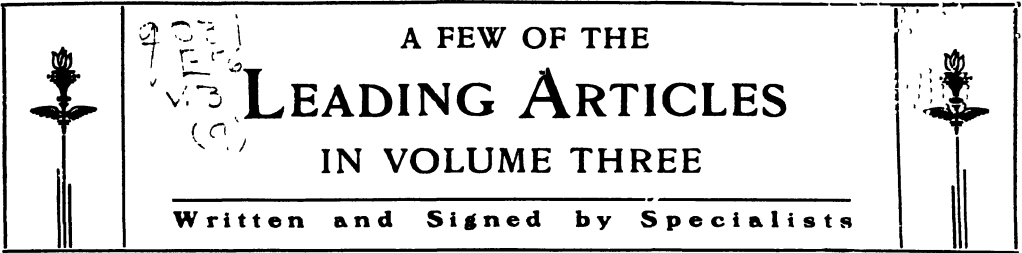
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KEY TO PRONUNCIATION.

ä	far, father	ñ	Span. <i>ñ</i> , as in <i>cañon</i> (căn'yõn), <i>piñon</i> (pẽn'yõn)
ā	fate, hate	ng	mingle, singing
a or ă	at, fat	nk	bank, ink
ā	air, care	ō	no, open
ạ	ado, sofa	o or ố	not, on
â	all, fall	ô	corn, nor
ch	choose, church	ò	atom, symbol
ē	eel, we	ọ	book, look
e or ẽ	bed, end	oi	oil, soil; also Ger. <i>eu</i> , as in <i>beutel</i>
è	her, over: also Fr. <i>e</i> , as in <i>de</i> ; <i>eu</i> , as in <i>neuf</i> ; and <i>œu</i> , as in <i>boeuf</i> , <i>cœur</i> ; Ger. <i>ö</i> (or <i>oe</i>), as in <i>ökonomie</i> .	ö or oo	fool, rule
ẹ	befall, elope	ou or ow	allow, bowsprit
ë	agent, trident	s	satisfy, sauce
ff	off, trough'	sh	show, sure
g	gas, get	th	thick, thin
gw	anguish, guava	th	father, thither
h	hat, hot	ū	mute, use
h or H	Ger. <i>ch</i> , as in <i>nicht</i> , <i>wacht</i>	u or ũ	but, us
hw	what	ú	pull, put
ī	file, ice	ü	between <i>u</i> and <i>e</i> , as in Fr. <i>sur</i> , Ger. <i>Müller</i>
i or ĭ	him, it	v	of, very
î	between <i>e</i> and <i>i</i> , mostly in Oriental final syllables, as, Ferid-ud-din	y	(consonantal) yes, young
j	gem, genius	z	pleasant, rose
kw	quaint, quite	zh	azure, pleasure
ñ	Fr. nasal <i>m</i> or <i>n</i> , as in <i>embonpoint</i> , <i>Jean</i> , <i>temps</i>	' (prime), " (secondary)	accents, to indicate syllabic stress

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Black, William, Scottish novelist: b. Glasgow, 13 Nov. 1841; d. Brighton, England, 10 Dec. 1898. He first studied art, but eventually became connected with the Glasgow press. In 1864 he went to London, and in the following year joined the staff of the *Morning Star*, for which he was special correspondent during the Austro-Prussian war of 1866. His first novel, 'Love or Marriage' (1868), was only moderately successful, but his 'In Silk Attire' (1869), 'Kilmeny' (1870), 'The Monarch of Mincing Lane,' and especially 'A Daughter of Heth' (1871), gained him an increasingly wide circle of readers. For four or five years he was assistant editor of the *Daily News*, but in 1874 his connection with journalism practically ceased. His other works include: 'The Strange Adventures of a Phaeton' (1872), containing descriptions of scenery much praised by Ruskin; 'A Princess of Thule' (1873); 'The Maid of Killeena' (1874); 'Three Feathers' (1875); 'Madcap Violet' (1876); 'Green Pastures and Piccadilly' (1877); 'MacLeod of Dare' (1878); 'White Wings, a Yachting Romance' (1880); 'Sunrise' (1880); 'The Beautiful Wretch' (1881); 'Shandon Bells' (1883); 'Judith Shakespeare' (1884); 'White Heather' (1885); 'Sabina Zembra' (1887); 'The Strange Adventures of a House-boat' (1888); 'In Far Lochaber' (1889); 'The New Prince Fortunatus' (1890); 'Wolfenberg' (1892); 'Highland Cousins' (1894); 'Briseis' (1896); and 'Wild Eelin' (1898). Black's novels have enjoyed much popularity, especially in the United States. His subjects are drawn from many lands, but it is in dealing with the Scottish Highlands that he is at his best. He also wrote a 'Life of Goldsmith' for the English Men of Letters series. See Wemyss Reid, 'William Black, Novelist' (1902).

Black Acts. Acts of the Scottish Parliaments from 1424 to 1594, so called from their being printed in black-letter. The term "Black Act" is also applied to an act of George I. with reference to the "Blacks," a body of armed deer-stealers and poachers, who infested Epping Forest.

Black and Tan Terrier. See TERRIERS.
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Black Apple, *Sideroxylon australe* or *Achras australis*, a tree of the natural order *Sapotacea*, native of New South Wales and Queensland. Its hard, close-grained wood is valued in cabinet-making, and also for carving, and its fruit, which is about as large as a plum, is used for food.

Black Art, the art or pretended art or practice of producing wonderful effects by the aid of superhuman beings or of departed spirits or the occult powers of nature. The reason why it was called black was that proficients in it were supposed to be in league with the powers of darkness. A large proportion of magical rites are connected with the religious beliefs of those using them, their efficacy being ascribed to supernatural beings. There is, however, a non-spiritual element in magic which depends on certain imagined powers and correspondences in nature, that can be utilized in various ways. In savage countries the native magician is often sorcerer and priest, and sometimes chief of the tribe. Among the ancient Egyptians magic was worked into an elaborate system and ritual, and it was regularly practised among the Babylonians and Assyrians, as well as in Greece and Rome. Alexandria, from the 2d to the 4th century, became the headquarters of theurgic magic, in which invocations, sacrifices, diagrams, talismans, etc., were systematically employed. This system, influenced by Jewish magical speculation, had a strong hold in mediæval Europe, and many distinguished names are found among its students and professors. The magic which still holds a place among the illiterate and ignorant classes has come down by tradition in popular folk-lore. The name natural magic has been given to the art of applying natural causes to produce surprising effects. It includes the art of performing tricks and exhibiting illusions by means of apparatus, the performances of automaton figures, etc. See ALCHEMY; ASTROLOGY; CHARM; DIVINATION; LEGERDEMAIN; WITCH-CRAFT.

Black Ash. See SODIUM.

Black Assize, a judicial sitting of the courts held at Oxford in 1577, and rendered historical by the pestilential and deadly fever

BLACK BAND—BLACK EARTH

which was introduced into the court from the jail, and swept away judges, jurymen, and counsel, and extended itself into the town and neighborhood. The superstitions of the age invested it with a special character, and it was remarked that no women nor poor people died of it.

Black Band, a variety of spathic iron ore occurring in beds in the coal measures, and containing a large percentage of bituminous matter. Most of the Scotch iron is obtained from it, but it is of little importance in the United States, though obtainable in Pennsylvania, Ohio, and Kentucky. See IRON.

Black Bass, Duck, etc. See BASS; DUCK.

Black Beauty, His Grooms and Companions, a story by Anna Sewall. It is written in the form of a horse autobiography, and is really a tract on the proper treatment of horses. The story is told with simplicity and restraint, and its vogue has been great, and its influence very wide.

Black Beetle, the English name for a cockroach, especially the Oriental cockroach (q.v.); also less commonly for the dark-colored beetles of the bad-smelling genus *Blaps*.

Black-bellied Plover, or **Black-breast**, one of the largest of the American plovers (*Charadrius squatarola*), also known throughout the northern parts of the Old World, where it is known as "gray" or "Swiss" plover, and whence it goes in winter to all parts of the southern hemisphere. It breeds in the Arctic regions, and is known in the United States only in its spring and fall migrations which are carried along the coasts, so that the bird is rare throughout the interior. Great flocks sometimes visit England in autumn, spreading over cultivated fields, and remaining until the coming of frost. It is about 11.50 inches in length, and has a large round head, and large eyes, whence the gunner's names, "bullhead," "beetlehead," and "ox-eye." In general form it resembles the golden plover (q.v.), but has a distinct though small hind toe. The general aspect is gray, dusky on the back, with the throat, breast, and a large part of the abdomen black, and the tail barred with black; bill and feet black. It is a favorite object of sport, and the young migrants in autumn are delicious eating; but it is not as easily shot as most of the shore-birds. It breeds along the shores of the Arctic Ocean.

Black Belt, an agricultural region of Alabama; 70 miles wide, extending entirely across the State, between 33° and 31° 40'; so called from the fact that the negroes greatly predominate in numbers, raising vast quantities of cotton from the richest of lands. It includes 17 counties, with over 500,000 inhabitants.

Black-cap, the name of various birds having the crown of their head black. In the United States it is given most often to the common titmouse, the chickadee (q.v.); and to a small fly-catching warbler, *Sylvania pusilla*, an olive and yellow bird with the top of the head crested with black. In England the common "black-cap" (*Curruca atricapilla*) is a small warbler, closely related to the nightingale, and one of the sweetest of European song-birds, which is frequently kept in cages.

Black Cat, an American fur-bearing animal. See FISHER.

Black Cockade, a badge first worn by the American soldiers during the Revolution, and later, during the hostility toward France occasioned by the X. Y. Z. dispatches, adopted by the Federalists as a patriotic emblem and as a rejoinder to the tri-colored cockade worn by the Republicans as a mark of affection toward France.

Black Co'hosh. See CIMICIFUGA.

Black Death, The, was an Oriental plague, marked by inflammatory boils and tumors of the glands, such as break out in no other febrile disease. On account of these boils, and from the black spots (indicative of putrid decomposition) which appeared upon the skin, it has been generally called the black death. In England the plague first broke out in the county of Dorset, whence it advanced through the counties of Devon and Somerset to Bristol, and thence reached Gloucester, Oxford, and London. From England the contagion was carried by a ship to Norway, where the plague broke out in its most frightful form. The period during which the black death raged with destructive violence in Europe was (with the exception of Russia, where it did not break out until 1351) from 1347 to 1350; from this latter date to 1383 there were various pestilences, bad enough, indeed, but not as violent as the black death. Ireland was much less heavily visited than England, and the disease seems scarcely to have reached the mountainous regions of that land; and Scotland, too, would perhaps have remained free from it had not the Scotch availed themselves of the discomfiture of the English to make an irruption into England, which terminated in the destruction of their army by the plague and the sword and the extension of the pestilence through those who escaped over the whole country. It may be assumed that Europe lost by the black death some 25,000,000 of people, or about one fourth of her entire population. Consult Boccaccio, 'Decameron'; Hecker, 'Epidemics of the Middle Ages' (1849) and 'The Black Death' (1890); Creighton, 'History of Epidemics in Britain' (1892); Gasquet, 'The Great Pestilence' (1894). See BUBONIC PLAGUE.

Black Dose, or **Draught**, a common purgative medicine consisting of sulphate of magnesia and infusion of senna, with aromatics to make it palatable. See SENNA.

Black Duck. See DUSKY DUCK.

Black Earth, a deposit in South Russia, extending over the steppes that border on the Black Sea, and the depressed area to the north of the Caspian, with a breadth from north to south of from 200 or 300 to nearly 700 miles. It varies in color from dark brown to black, and in thickness from a foot or two up to six or seven yards, occasionally reaching, it is said, even to 60 feet. It is composed chiefly of siliceous sand (about 70 per cent), alumina and other ingredients (23 per cent), and organic matter (about seven per cent). It appears to be unfossiliferous. It bears the same relation to the glacial accumulations of Russia that the loess of the Rhine, the Danube, etc., does to those of central Europe, and is probably the fine-grained silt derived from the torrents and flooded rivers that escaped from the melting snows and glaciers of the glacial period. According to some geologists, however, it may

BLACK GUM—BLACK HOLE OF CALCUTTA

owe its origin to the action of the wind. It is supposed by them to be simply an accumulation of wind-blown dust—the finely sifted material being fixed by the abundant grasses of those steppe regions.

Black-eyed Susan, the name of a once popular comedy by Douglas Jerrold. It appeared in 1829 and was founded on Gay's ballad 'Sweet William's Farewell to Black-Eyed Susan.'

Black Flags, an organization of Chinese rebels who established themselves in the Red River valley in Tonquin, after the suppression of the Taiping Rebellion in southern China (1850-4). From their warlike character and desperate deeds they were called Black Flags as distinguished from the peaceable Yellow Flags. They assisted the Tonquinese and Chinese in opposing the French wars (1873, 1882, and 1885), with signal results. Their principal object was plunder. They were responsible for the appalling massacre, in 1884, of French missionaries and native Christians, to the number of 10,000.

Black Fly, a species of the genus *Simulium*, the common black fly of northern New England, Canada, and Labrador probably being *S. molestum*. In this tormenter of travelers and fishermen the body is short and thick, the labrum is free, sharp as a dagger, and the proboscis is well developed and draws blood profusely. It is black, with a broad silvery ring on the legs. The species are numerous.

The cylindrical larva is furnished with short antennæ, and near the mouth are two flabelliform appendages. The pupa has eight very long lateral filaments on the front of the thorax, and the posterior end of the body is enclosed in a semi-oval membranous cocoon, open in front, and posteriorly attached to some submerged plant such as eel-grass. The fly leaves the pupa beneath the water. She deposits her eggs on the rocks in a compact layer a few inches above the surface of the water. The eggs of the Hungarian or "Columbacz midge" are enveloped in a yellowish-white slime and deposited at the end of May or early in June upon stones or grass over which water flows, or in the brooks of the more elevated regions. The number laid is variously estimated at from 500 to 5,000. The food of the larva of the buffalo-gnat has been proved to be carnivorous, and it is supposed that the larvæ of all the species live on animal matter, though possibly in some cases on dead leaves. On hatching the larvæ become attached to plants, etc., or to each other, by a silken thread, forming long floating strings. When the fly issues from the submerged pupa-case she rises to the surface, then being protected by a fine silky covering of hairs. The adult fly in central New York issues about the first of April, and those apparently of a new brood the first of June; after this there is a succession of generations throughout the season; the development of a single brood occupying about two months. The larva hibernates.

While the black fly of Maine, and presumably of Labrador, is of the species *S. molestum*, that of the St. Lawrence valley has been named *S. invensum*, and is said to be different from that of Lake Superior. A remarkably large species is known as *S. pictipes*; its larvæ

and pupæ were found in the rapids of the Au Sable River, and also similar ones on the north shore of Lake Superior.

The black fly is mostly active in the bright sun-light, mostly disappearing on cloudy days, but it is known to crawl under one's clothes and to bite in the night. The bite is often severe, the creature leaving a large clot of blood behind it. The best preventive is oil of tar, and the use of various ointments.

Black Forest (German, *Schwarzwald*), a chain of mountains in the grand-duchy of Baden and the kingdom of Württemberg. It runs almost parallel with the Rhine, from south to north, often only from 15 to 20 miles distant; is about 85 miles long, and from east to west in the southern part about 30 miles wide; in the northern about 18. The Danube, as well as many other rivers, rises in these mountains. Those on the west side run into the Rhine; those on the east side into the Danube. The Black Forest is rather a chain of elevated plains than of isolated peaks. The highest summit, the Feldberg, measures 4,900 English feet. Except from June to September, these mountains are generally covered with snow, and even during this period are not entirely free from it. Among the many valleys of this chain, the Murgthal is particularly celebrated for its beautiful scenery. The whole chain consists of primitive mountains: its skeleton throughout is granite; its higher points are covered with sandstone, and other layers of less consequence. On the western side, at the foot, appears gneiss. Porphyry and clay-slate are found on several heights, as likewise silver, lead, copper, iron, cobalt, and other minerals. The forests are extensive, and consist mostly of pines and similar species. The raising of cattle is the principal branch of husbandry carried on in this district. The ground is not fertile, and the inhabitants scattered over the mountains live very frugally, and are very industrious. The vast quantity of timber growing here has long been a considerable source of revenue. The timber of the Black Forest was always highly prized by the Dutch, and the export to Holland is still largely carried on, the trees being conveyed down the Rhine in the form of rafts. Many saw-mills are kept at work cutting up the timber; and the forests also give employment to charcoal-burners, potash-boilers, etc. The manufacture of the well-known wooden clocks, toys, etc., is another important branch of industry, in which many persons are employed. Watches are also made, as well as orchestrons and other musical instruments. Neustadt, Friberg, Hornberg, and Furtwangen are central points of the manufacture of wooden wares, the commerce in which embraces all Europe, and extends to America and Australia.

Black Friars, friars of the Dominican order: so called from the color of their habit. See DOMINICANS.

Black Friday, the name given in the United States to two days that ushered in financial panics. First, Friday, 24 Sept. 1869, when the attempt of Jay Gould and James Fisk, Jr., to create a corner in the gold market by buying all the gold in the banks of New York city, amounting to \$15,000,000, culminated. For several days the value of gold had risen steadily, and the speculators aimed to carry it from 144 to 200. Friday the whole city was in a ferment,

BLACK GUM—BLACK HOLE OF CALCUTTA

the banks were rapidly selling, gold was at 162½, and still rising. Men became insane, and everywhere the wildest excitement raged, for it seemed probable that the business houses must be closed, from ignorance of the prices to be charged for their goods. But in the midst of the panic it was reported that Secretary Boutwell of the United States treasury had thrown \$4,000,000 on the market, and at once gold fell, the excitement ceased, leaving Gould and Fisk the winners of \$11,000,000. The second was 19 Sept. 1873, when numerous failures on the New York Stock Exchange precipitated the panic of 1873.

The term was first used in England, being applied in the first instance to the Friday on which the news reached London, 6 Dec. 1745, that the young pretender, Charles Edward, had arrived at Derby, creating a terrible panic; and finally to 11 May 1866, when the failure of Overend, Gurney & Company, London, the day before was followed by a widespread financial ruin. Good Friday is also known as Black Friday in some countries, because of the use of black vestments and draperies in the churches.

Black Gum. An American tree. See **PEPERIDGE**.

Black Hawk, chief of the Sac Indians: b. Kaskaskia, Ill., 1767; d. near Fort Des Moines, 3 Oct. 1838. He was made chief of the Sacs in 1788; and in 1804 repudiated the first agreement made by the Sacs and Foxes with the United States to give up their lands east of the Mississippi. The possession of the territory was disputed for a number of years; in 1823 the majority of the two tribes moved across the river, and a treaty with the United States, ceding the disputed territory, was signed in 1830. Black Hawk, however, objected to the whites occupying the vacated territory, and in June 1831, he began the Black Hawk war by crossing the Mississippi with a small force and attacking some Illinois villages. Driven off by the militia under Gen. Gaines, he returned in the spring of 1832 with a larger force and began to massacre the white settlers. The Indians were however defeated by United States troops in two battles near the Wisconsin River, 21 July 1832, and near the Bad-Axe River, 1-2 Aug. 1832. The war was brought to an end by the surrender of Black Hawk in the latter part of August. He was kept a prisoner till 1833, then rejoined his tribe on their reservation, near Fort Des Moines.

Bibliography.—Drake, 'Life of Black Hawk'; Patterson, 'Life of Black Hawk'; Snelling, 'Life of Black Hawk'; Thwaite, 'Story of the Black Hawk War' (Wisconsin Historical Society 'Papers' Vol. XII.).

Black-Hawk War. See **BLACK HAWK**.

Black Hills, a region in South Dakota, extending into Wyoming. It was purchased from the Indians in 1876, for whom it had been one of the finest hunting grounds in the West. In 1877-8 thousands of miners went there, and in 1880 there had already sprung into existence three towns, Deadwood, Central City, and Leadville. Around these lay also groups of smaller towns and villages. From 1880 the gold mines yielded about \$4,000,000 annually, and the silver mines about \$3,000,000 annually. The region is also rich in copper, lead, iron and mica. The

soil is fertile and the hills have abundant facilities for the grazing of cattle. Thrifty farmers have settled there, and many of them have good farms and fine improvements. Good school-houses have also been built in different settlements. See **SOUTH DAKOTA**.

Black Hole of Calcutta, a small chamber, 20 feet square, in Fort William, Calcutta. On the capture of Calcutta by Surajah Dowlah, 20 June, 1756, the English garrison, consisting of 146 men, under the command of Mr. Holwell, were locked up for the night in the common dungeon of the fortress, a strongly barred room, 18 feet square, and never intended for the confinement of more than two or three men at a time. There were only two windows, and a projecting veranda outside and thick iron bars within materially impeded what little ventilation there might be, while conflagrations raging in different parts of the fort gave the atmosphere an unusual oppressiveness. The unhappy creatures, exhausted with previous fatigue, were packed so tightly in their prison that it was with difficulty the door could be closed. A few moments sufficed to throw them into a profuse perspiration, the natural consequence of which was a raging thirst. One of the soldiers stationed in the veranda was offered 1,000 rupees to have them removed to a larger room. He went away, but returned saying it was impossible. The bribe was then doubled, and he made a second attempt with a like result; the nabob was asleep, and no one dared wake him. By nine o'clock several had died, and many more were delirious. A frantic cry for water now became general, and one of the guards, more compassionate than his fellows, caused some to be brought to the bars, where Mr. Holwell and two or three others received it in their hats, and passed it on to the men behind. In their impatience to secure it nearly all was spilt, and the little they drank seemed only to increase their thirst. Self-control was soon lost; those in remote parts of the room struggled to reach the window, and a fearful tumult ensued, in which the weakest were trampled or pressed to death. They raved, fought, prayed, blasphemed, and many then fell exhausted on the floor, where suffocation put an end to their torments. About 11 o'clock the prisoners began to drop off fast. At length, at six in the morning, Surajah Dowlah awoke, and ordered the door to be opened. Of the 146 only 23, including Mr. Holwell (from whose narrative, published in the 'Annual Register' for 1758, the account of this event is partly derived), remained alive, and they were either stupefied or raving. Fresh air soon revived them, and the commander was then taken before the nabob, who expressed no regret for what had occurred, and gave no other sign of sympathy than ordering the Englishman a chair and a glass of water. Notwithstanding this indifference, Mr. Holwell and some others acquit him of any intention of causing the catastrophe, and ascribe it to the malice of certain inferior officers, but many think this opinion unfounded. Holwell and three others were sent prisoners to Muxadavad; the rest of the survivors obtained their liberty, and the dead bodies were carelessly thrown into a ditch. The Black Hole is now used as a warehouse, and an obelisk, 50 feet high, was erected in memory of the victims.

BLACK JACK—BLACK RIVER

Black Jack, a term loosely applied by miners to blende, the sulphuret of zinc, or to any other ore which resembles it in being obnoxious to them, if in no other respect. It is also the name commonly given in the southern States to a small species of oak tree (*Quercus stellata*), also called post-oak, for its being, when full grown, of a convenient size for making posts.

Black Knight, The, a name given by romantic writers to various heroic characters. In Scott's 'Ivanhoe' Richard Cœur de Lion masquerades as the Black Knight. The Knight Esplandian, son of Amadis of Gaul and Oriana, is also so called. In the Arthurian legend the Black Knight, Sir Perekay, was one of the four brothers who kept the passage of Castle Dangerous.

Black Law, in the United States the name given to certain laws in force before the Civil War in many of the northern and border States discriminating against free negroes who might become citizens. Such laws excluded negroes from the public schools and from the militia, forbade them to testify in court against a white man, or in any case in which a white man was interested.

Black Lead. See GRAPHITE.

Black Letter, that variety of type otherwise designated Gothic, and which in a modified form is the ordinary type made use of in Germany, although in recent years there has been a tendency to employ the Roman letter, the Gothic type being considered injurious to the eyes. The earliest printed books were in black letter. See PRINTING.

Black Lilly. See FRITILLARY.

Black List, a list of bankrupts or other persons whose names are officially known as failing to meet pecuniary engagements. The term is also applied to a list of employees who have been discharged by a firm or corporation and against whom some objection is made and reported to other firms or corporations to prevent them obtaining employment. Blacklisting is made a punishable offense by the laws of some States. See Eddy, 'Laws of Combinations' (1901).

Black Monday. (1) A name for Easter Monday, in remembrance of the dreadful experiences of the army of Edward III., before Paris, on Easter Monday 14 April 1360. Many soldiers and horses perished from the extreme cold. (2) The 27th of February, 1865, a memorable day in Melbourne, Australia, when a destructive sirocco prevailed in the surrounding country.

Black Mountains, the culminating group of the Appalachian system, named from the dark growth of balsam-firs and other evergreens which cover their summits. Their position is in Yancey and Buncombe counties, North Carolina, between the main central ridges on the west and a portion of the Blue Ridge on the east. Unlike the other ridges of the Alleghenies, they lie for the most part transverse to the general trend of the range, and give this direction to the great valleys and rivers included between them. They rise from a district of great elevation, the height of the valley at Asheville, on the French Broad River, being about 2,000 feet above the sea, and that of Toe River, at Burns-

ville, Yancey County, about 2,500 feet. From this plateau the drainage is toward the Ohio in a northerly direction by the branches of the Great Kanawha, by those of the Holston and the French Broad toward the southwest, and by those of the Yadkin and the Catawba into the Pedee and Santee toward the southeast. This position at the sources of streams flowing in such diverse directions, long since pointed out this district as probably the most elevated east of the Rocky Mountains. The chief peaks are Mitchell, 6,710, and Clingman's Peak, Guyot's Peak, or Balsam Cone, Sandoz Knob, Hairy Bear, Cat Tail Peak, Gibbs's Peak, Sugar Loaf, or Hallback Peak, Potato Top, Black Knob, Bowler's Pyramid, Roan Mountain, all of which are above 6,500 feet in height.

Black Prince (EDWARD, PRINCE OF WALES), the son of Edward III. of England. He is thus styled in history by reason of the color of his armor. He died in 1376 and his son became king in 1377 as Richard II.

Black-quarter, an apoplectic disease which attacks cattle, indicated by lameness of the fore-foot, one of the limbs swelling, and after death being suffused with black blood, which also is found throughout the body. The disease, which chiefly attacks young cattle, is due to undrained fertile pasture, or to the too rapid transference of the cattle from poorer to richer soils. It is difficult to cure, but may be prevented by thorough draining or by giving regular doses of nitre to all the animals. The usual treatment consists in blood-letting, cutting into the swollen parts, and administering first nitre and afterward ammonium acetate and purgatives. In the United States the disease is especially prevalent in Texas, Kansas, Nebraska, South Dakota, and Colorado.

Black Republic, a name applied to the Republic of Haiti, which is under the dominion of the African race.

Black Republicans, in the United States, members of the Republican party, so called because they resisted the introduction of slavery into any State where it was not already recognized.

Black River, the name of several American rivers. (1) A river which rises in New York in Herkimer County, and after passing through Oneida and Lewis counties, changes its course at a place called Great Bend, passes by Watertown, and flows through Black River Bay into Lake Ontario. Near Turin, in Lewis County, it has a fall of about 63 feet. Below the fall, it is navigable to Carthage, a distance of 40 miles. The whole length of the river is 125 miles, and its breadth at Watertown (six miles from its mouth) is 60 yards. (2) A river of Missouri and Arkansas, also known as the Big Black River, the largest affluent of White River. It rises in the southeastern part of the former State, takes a southerly course, enters Arkansas, and joins the White River 40 miles below Batesville. During nine months of the year it is navigable for a distance of 100 miles from its mouth. Its entire length is about 400 miles. Trout and other excellent fish are caught in its waters in great abundance. (3) A river of Wisconsin. It rises in Marathon County and enters the Mississippi 15 miles above La Crosse, after a course of 225 miles. (4) A river of Vermont which rises in the town of Plymouth and

BLACK RIVER FALLS — BLACKADDER

is a tributary of the Connecticut. Its abundant water power is utilized by various manufacturing along its course. (5) A portion of the Washita River in Louisiana between the mouth of the Tensas River and the Red River; also sometimes styled Black River.

Black River Falls, Wis., a city and the county-seat of Jackson County, 171 miles north of Milwaukee. A fine water power is afforded by the falls of the Black River, and there are flour and lumber mills, wagon and other factories, foundries, machine shops, and nurseries. There are iron mines in the neighborhood, and kaolin deposits from which fire-brick are manufactured. Pop. (1900) 1,938.

Black Rock Desert, a tract of nearly 1,000 square miles, north of Pyramid Lake, in Nevada. In summer it is a barren level of alkali and in winter covered in places with shallow water. Called also "Mud Lakes."

Black Rod, Usher of the, an officer of the House of Lords, appointed by letters patent from the Crown, and employed to execute orders for the commitment of parties guilty of breach of privilege and contempt, to assist at the introduction of peers and other ceremonies; and to summon the Commons to attend in the House of Lords when the royal assent is given to bills. His proper title is gentleman-usher of the black rod; that of his deputy, yeoman-usher.

Black Rood of Scotland, a cross of gold in the form of a casket, alleged to contain a piece of the true Cross. It was brought to Scotland in the 11th century by Margaret, queen of Malcolm III.; was bequeathed as an heirloom, and regarded as a sacred relic. It was delivered to Edward I. in 1291, but restored to Scotland after the Peace of Northampton in 1328. It was finally taken in battle by the English in 1346, and hung in the Cathedral of Durham until the Reformation, when it disappeared.

Black Saturday, 4 Aug. 1621; so called in Scotland because a violent storm occurred at the very moment the parliament was sitting to enforce episcopacy on the people. The name has also been applied to 10 Sept. 1547 on which date the disastrous battle of Pinkie was fought.

Black Sea (Lat. *Pontus Euxinus*), a sea situated between Europe and Asia, and bounded on the west by Turkey, Bulgaria, and Rumania, northwest, north and east by the Russian dominions, and on the south by Anatolia (Asia Minor), being connected with the Mediterranean by the Bosphorus, and with the Sea of Azov by the Strait of Yenikale. The area of the Black Sea and the Sea of Azov amounts to 168,500 square miles. The water is not so clear as that of the Mediterranean, and, on account of the many large rivers which fall into it,—the Danube, Dniester, Dnieper, Don, Kuban, etc.,—being less salt, freezes more readily. The tempests on this sea are sometimes tremendous in winter, as the land which confines its agitated waters gives to them a kind of whirling motion; but being practically clear of islands and rocks its navigation is not difficult on the whole. In 1854 one of its tremendous storms occasioned a very serious loss to the shipping of the allied British and French. The fisheries in the Sea of Azov and the Black Sea are not unimportant, various kinds of valuable fish both large and

small being taken; among others, several species of sturgeon. Caviare is made on the coast, as well as fish-glue, fish-oil, and, from the spawn of the sea mullet, botargo. The chief ports are Odessa, Kherson, Nicolaiev, Sebastopol, Novorossisk, Batoum, Trebizond, Samsun, Sinope, and Varna. It contains no islands of any note. After the capture of Constantinople (1453) the Turks excluded all but their own ships from the Black Sea till 1774, when the Russians obtained the right to trade in it, the same right being accorded to Austria in 1784, and to Britain and France in 1802. The preponderance thereafter gained by Russia was one of the causes of the Crimean war, by which she was compelled to cease keeping armed vessels on it, the sea being declared neutral by the Treaty of Paris in 1856. In 1871, however, the sea was deneutralized by a conference of the European powers (France being unrepresented) at London in response to a protest from Russia.

Black Tin, tin ore when dressed, stamped, and washed ready for smelting, forming a black powder. See TIN.

Black-vomit, a form of vomiting occurring usually in severe cases of yellow fever, due to the presence of blood in the stomach. See YELLOW FEVER.

Black Wad, an ore of manganese, used in making chlorine gas and as a drying ingredient in paints. It is an earthy variety of the peroxide found in low-lying districts, and is often mixed with oxides of cobalt or copper.

Black Walnut. See WALNUT.

Black Warrior, an American merchant vessel, seized and confiscated by Cuban customs officers in May 1854. This seizure was used as an excuse for proposed filibustering expeditions against Cuba. Spain, however, made compensation for the seizure.

Black Warrior, a river of Alabama, formed by the confluence of the Locust and Mulberry forks. It flows into the Tombigbee near Demopolis, after a course of 300 miles, and is navigable in its lower course to Tuscaloosa.

Black Watch, The, a famous British regiment, originating as a body of Highlanders, raised about 1668, for the purpose of keeping the peace in the Highlands, and so named from their dark dress. They were embodied in the regular army under the title of the 42d regiment in 1739. It first distinguished itself in the battle of Fontenoy (1745). Since then it has served in almost all the important wars in which Great Britain has been engaged. From 1756 till 1767 the regiment was in America, and on its return it received the title of Royal Highlanders. It again served in America during the War of Independence; and in 1801 it particularly distinguished itself in Egypt at the battle of Alexandria. The Black Watch was also present at Napoleon's final defeat in the battle of Waterloo; and since then it has gained special mention for its conduct at the Alma, in the Ashantee war, and at Tel-el-Kebir.

Black Water State, a popular nickname for Nebraska.

Black Witch. See ANI.

Blackadder, John, Scottish preacher: b. 1615; d. December 1685. He entered the Presbyterian ministry and when, in 1662, the episcopal



WHITE BLACKBERRY, "ICEBERG"

BLACKBERRY — BLACKBIRD

form of church government was forced upon a people who were generally repugnant to it, Blackadder, so far from complying with the new system, employed himself for several successive Sundays in exposing what he considered its unlawfulness, and, in his own words, entered his "dissent in heaven" against it. He was obliged to demit his charge in favor of an Episcopal incumbent, and in 1670, having performed worship at a conventicle near Dunfermline, where the people had armed themselves for self-defense, he was summoned before the privy council, but contrived to elude their power. On one occasion he preached at Kinkell, near St. Andrews; the people flocked from the metropolitan city to hear him, notwithstanding all the injunctions and surveillance of Archbishop Sharpe. It is said, that on Sharpe desiring the provost to send out the militia to disperse the congregation, he was informed that it was impossible—the militia had gone already as worshippers. After spending several months in Holland, in 1680 he returned to Scotland, and in the succeeding year was apprehended, and confined in the state prison upon the Bass Rock, where he died. See Crichton, 'Life of Blackadder' (1823).

Blackberry, various species of *Rubus* (q.v.), in which the drupelets adhere to the receptacle after ripening. Two general types are common: the trailing or dewberry (q.v.), and the upright, which is more generally known as the blackberry. The leading or representative species of this group is the very variable *R. nigrobaccus* (*R. villosus* of some botanists), which since 1841, when the first variety was introduced, has developed numerous varieties and has become in America, but not elsewhere, an important commercial fruit. It is used chiefly as a dessert fruit, but is also preserved, canned and evaporated. The plant thrives best on a northern slope and on rather heavy, loamy soils retentive of moisture but well drained. The soil must not be rich in nitrogenous food, since this tends to increase wood at the expense of fruitfulness. On light soils the plants are likely to suffer from lack of moisture in dry seasons. Potash fertilizers are required in abundance. Plants are usually propagated from root cuttings or suckers, and when one season old the smaller varieties are set in the field usually three by eight feet apart, the larger four by ten or else in checks six by six feet or more. When set in checks cultivation may be given both ways. For cultivation, diseases, etc., see RASPBERRY. In Europe the bramble (*R. fruticosus*) is called the blackberry. It is not extensively cultivated. Consult: Bailey and Miller, 'Cyclopædia of American Horticulture' (1900-2); Card, 'Bush Fruits' (1901).

Blackberry Lily (LEOPARD FLOWER) (*Belamcanda punctata*), a perennial herb, out of the two species of its genus of the natural order *Iridaceæ*, native of Japan and China and long cultivated as a garden plant for its orange, red-spotted flowers. Its popular names were suggested by the blackberry-like clusters of roundish seeds and the spotted flowers. The seed stalks are occasionally used for decoration with dried grass. The seeds may be sown in a sunny place where the soil is light and rich, and in after years the root-stocks may be divided.

Blackbird, the name given to two distinct species of birds: (1) The American grackles (q.v.) of the family *Icteridæ*, which consists of about a dozen species differing in size and color. (2) The English song-thrush or "merle." Four species are known in the eastern States, namely: the purple grackle, and rusty grackle, the red-winged blackbird, and the cow-bird.

The most familiar American one is the crow-blackbird, more properly termed purple-grackle, because of the iridescent or metallic gloss on its plumage. This bird is found throughout the entire East, and as far west as Dakota. It is the largest variety, being 12 inches in length. In the spring flocks of these grackles are found among the advance guard of the returning hosts of the homeward-bound migrants, although many remain in the southern States throughout the entire winter season. Their nests, located along the edges of the swamps, are rude, strong structures of sticks and reeds, placed among the branches of bushes, in the tops of tall pine trees, or in holes of old tree-stumps. The eggs are remarkably varied in size, shape and color, some being pointed, others long and slender, while others are nearly globular, the length averaging about 1.25 by .90 of an inch. The color is any shade of dirty white, light-blue or green, and the markings consist of confused blotches, scratches, and straggling lines of various dark tints. A bird similar in its habits and mode of life to the purple-grackle is the rusty blackbird, lacking only the metallic hues, its plumage being rusty black. The marshes where they breed are great centres of blackbird population, and there they collect in great flocks of young and old as the end of the season approaches. At this time they visit any neighboring fields of Indian corn, sometimes in hordes, to tear open the husks, feed upon the milky kernels, and make themselves obnoxious to the farmers, although, indisputably, they are, on the whole, beneficial by their destruction of insects. The red-winged blackbird (*Agelaius phœniceus*), a variety of which is also found on the Pacific coast, varies in color from the bird of the eastern States, in the fact that it has on the wing a dark, blood-red patch, bordered with pure white, the other possessing only the scarlet patches on each shoulder, from which it takes its name. The nests of the red-winged blackbird are placed near the ground, among reeds or in small bushes and swamps. The eggs are smaller and lighter in color than those of the grackle, but resemble them in the scrawled markings. The French-Canadians call them "officer-birds." The impression upon the beholder, as he gazes at the prodigious flocks of tens of thousands of these red-epauleted blackbirds, when gathered upon the marshes preparing for the fall migrations, and wheeling in regular lines as they fly, their epaulets glistening in the sun, is that of an army of soldiers. Besides these, there is found in the middle west the handsomest of the family, the yellow-headed blackbird (*Xanthocephalus xanthocephalus*), in which the whole head and throat are rich orange-yellow. The females of all these species are strikingly contrasted in plumage to their mates, having only a streaked brown dress instead of glossy black and red or yellow of the males. The young resemble the females in their protected dullness of plumage. For the English Blackbird, see SONG THRUSH. For the cow-bird, see COW-BIRD.

BLACKBREAST — BLACKFISH

The name is given to various other birds, prevaillingly black in plumage, as, for example, to the bobolink (q.v.), which is called "skunk blackbird," because of the resemblance in its black and white markings to those of a skunk; and to the ani of Florida and the West Indies, which is commonly termed "savanna blackbird."

See Baird, Brewer and Ridgway, 'North American Birds' (Boston 1874); Ingersoll, 'Wild Life of Orchard and Field' (1902).

Blackbreast, a local name among American sportsmen for (1) the black-bellied plover (*Charadrius squatarola*); (2) the dunlin (*Tringa alpina*), also called "blackheart."

Blackbuck, the common small antelope (*Antelope cervicapra*), of the plains of India and Assam. This is the typical antelope, with horns from 16 to 20 inches long, rising in an elegant spiral from the top of the head. The body is blackish brown above, sharply contrasted with white on the under parts, and with a conspicuous white ring around each eye. These handsome little antelopes go about ordinarily in family parties, but sometimes gather in large herds, and are a favorite object of sport in India, where they are usually chased on horseback with greyhounds—sometimes also with the cheeta (q.v.), or by the aid of falcons. They are so swift that the best of dogs are required to catch them. They continue numerous because they are never hunted by the native Hindus, on account of religious prejudices. Consult: Baker, 'Wild Beasts and Their Ways,' and other writers upon the sport and natural history of India.

Blackburn, Henry, English journalist and art critic: b. Portsea, 15 Feb. 1830. He was educated at King's College, London. Beside contributions to newspapers and magazines, he has written 'Life in Algeria' (1864); 'Art in the Mountains: the Story of the Passion Play in Bavaria' (1870); 'Breton Folk' (1879); etc.

Blackburn, Joseph Clay Styles, American lawyer: b. Woodford County, Ky., 1 Oct. 1838; was graduated at Centre College, Danville, Ky., in 1857; admitted to the bar in 1859, and practised in Chicago. During the Civil War he served in the Confederate army, and after the war resumed practice in Kentucky. In 1871 he was elected to the Kentucky legislature, and in 1874 to Congress; and was a United States Senator in 1885-97 and again elected for the term 1901-7. During the presidential campaign of 1896 he was a leader in the free coinage silver movement.

Blackburn, Luke Pryor, American physician: b. Fayette County, Ky., 16 June 1816; d. 14 Sept. 1887; was graduated at Transylvania University, Lexington, Ky., in 1834, and began practising in that city. When cholera broke out in the town of Versailles he went there and gave his services free during the epidemic. In 1846 he went to Natchez, Miss., and in 1848, when yellow fever appeared in New Orleans, as health officer of Natchez, he originated the first quarantine against New Orleans that had ever been known in the Mississippi valley. During the Civil War he was a surgeon on the staff of Gen. Price. In 1875, when yellow fever broke out in Memphis, he hastened to the city and organized a corps of physicians and nurses, and in 1878 gave his services to the yellow fever

sufferers at Hickman, Ky. He was elected governor of Kentucky in 1879. He founded the Blackburn Sanitarium for Nervous and Mental Diseases in 1884.

Blackburn, William Maxwell, American Presbyterian clergyman and educator: b. Carlisle, Ind., 31 Dec. 1828; d. 1900. He became president of the University of North Dakota in 1884 and of Pierre University, South Dakota, in 1885, and president-emeritus of the last (now Huron College) in 1898. He wrote 'St. Patrick and the Early Irish Church'; 'Admiral Coligny and the Rise of the Huguenots'; 'History of the Christian Church,' etc.; and the 'Uncle Alick' series of juvenile stories.

Blackburn, England, a municipal, parliamentary, and county borough in Lancashire, 21 miles north-northwest from Manchester. There is a free grammar school, founded by Queen Elizabeth in 1557; a free school for girls, founded by William Leyland in 1765; a technical school, and a free library. The town-hall, infirmary, exchange, municipal offices, county court, county police station, opera house, library and museum, and union workhouse are all modern and handsome buildings. There are two public parks, one beautifully situated on the declivity of Revidge Hill. The railways all converge, and pass through one large railway station belonging to the Lancashire & Y. Ry. Company. The corporation owns all the public utilities. Blackburn is one of the chief seats of the cotton manufacture, there being upward of 140 mills, as well as works for making cotton machinery and steam-engines. The cottons made in the town and vicinity have an annual value, of about \$25,000,000. Pop. (1901) 127,527.

Blackcock, or **Heathcock**, a large European grouse (*Tetrao tetrix*), so called because of the glossy black color of the cock. The female is grayish, mottled in darker colors, and is called "grayhen," or "heathhen." See CAPERCALLIE.

Blackfeet Indians, a tribe of Indians inhabiting the United States and Canada from the Yellowstone to Hudson Bay. They received this name from the fact that the first ones seen by white men wore leggings blackened by traveling over the burnt prairie. They call themselves "plainsmen." At the end of the first quarter of the 19th century they numbered nearly 50,000. In 1903, less than 6,000 remained, of whom nearly half were on the reservation in Montana.

Blackfin. See BLUEFIN.

Blackfish, any one of a variety of dark-colored fishes, both of America and Europe. For the American "blackfish," see TAUTOG; SEABASS, and MINNOW. The English "blackfish" is a kind of mackerel (*Centrolophus niger*), about two feet long. It occurs rather abundantly off the south coast of Europe, and is much esteemed as a food fish.

The name is also given to a small "killer" whale of the genus *Globiocephalus*, which goes about in herds that often enter harbors. They are sought by fishermen for the sake of a small amount of oil, resembling sperm-oil, to be obtained from their fat, and also for the sake of their beef-like flesh. The common blackfish of the Atlantic is *G. brachypterus*, and that of the

BLACKGUARD — BLACKMAIL

North Pacific *G. scammoni*. Sailors give the name "blackfish" to the "caaing," or "pilot" whale (q.v.), and to various other small cetaceans. Consult: Bullen, 'Cruise of the Cachalot'; Scammon, 'Marine Mammals of North America.' See also KILLER.

Blackguard, a term used in the 16th century for the lowest menials of a noble house, the scullions who cleaned pots and pans. It was also used of the hangers-on of an army, camp followers, then a rabble, and to vagabonds in general.

Blackhead, the name for several animals, characterized by the blackness of the head; especially in the United States: (1) the scaup duck; (2) a common minnow, the fathead (q.v.). The name is also applied to the accumulations of dirt found in the sebaceous follicles. See ACARUS.

Blackheath, an elevated heath in the county of Kent. It borders on Greenwich Park, and is about five miles from St. Paul's, London. It contains 267 acres, offers fine views, and is a place of popular resort, much used for cricket-playing. In 1831 Wat Tyler and John Ball mustered their followers here. Jack Cade occupied the same position twice in 1450. In 1497 the Cornish insurgents, under Lord Audley, were routed there by the king's forces. Blackheath has been the scene of many historical pageants and processions, as it was formerly the custom for the mayor and corporation of the city of London, and even the king and court, to repair thither to meet illustrious foreigners from the Continent. Henry IV. met there (1400) the Byzantine emperor, Michael Palæologus; the corporation of London there met Henry V., on his return from Agincourt, and the year afterward, the Emperor Sigismund. The most splendid, and one of the last of all, was the reception of Anne of Cleves, by Henry VIII., January 1541; she was conducted through Greenwich Park to the palace at Greenwich, followed by prodigious numbers of nobility and gentry, and 1,200 privileged citizens, clad in velvet and chains of gold.

Blackhorse, a fish, one of the suckers of the Mississippi valley (*Cycleptus elongatus*); also known as the Missouri or gourdseed sucker. It is about two feet long, with a small head, suggesting, in profile, that of a horse, and becomes almost jet-black in spring. See SUCKER.

Blackie, John Stuart, Scottish poet, litterateur, and professor: b. Glasgow, 1809; d. 2 March 1895. He was educated at the universities of Aberdeen and Edinburgh; subsequently went to Göttingen, Berlin, and Rome, where he continued his studies, which were chiefly connected with philology. In 1834 he published a translation of Goethe's 'Faust,' and the same year became an advocate at the Scottish bar; in 1841 he accepted the chair of humanity in Marischal College, Aberdeen. This position he held until, in 1852, he was appointed to the professorship of Greek in the University of Edinburgh, a chair which he resigned in 1882. By his unwearying efforts to preserve the Gaelic language, he succeeded in raising \$60,000, with which sum a Celtic chair was endowed in Edinburgh University. Among his more important writings are: 'Lyric Poems'; 'Homer and the

Iliad'; 'Musa Burschicosa'; 'Horæ Hellenicæ'; 'Self-culture'; 'Songs of Religion and Life'; 'Lays of the Highlands and Islands'; 'Lay Sermons'; 'Altavona'; 'Wisdom of Goethe'; 'Life of Burns'; 'Scottish Song'; and 'Song of Heroes.' His biography has been published (2 vols.) by Anna M. Stoddart.

Blacking, the article employed in blacking boots and shoes, usually contains for its principal ingredients oil, vinegar, ivory, or bone black, sugar or molasses, and strong sulphuric acid, though every manufacturer has his own recipe, and endeavors to turn it to best account by concealing its composition and puffing its merits. Blacking is used either liquid or in the form of a paste, but both are obtained from the same ingredients, the only difference being that in making the paste a portion of the liquid is withheld. A celebrated old English blacking consists of 18 ounces of caoutchouc dissolved in 9 pounds of hot rape-oil, 60 pounds ivory-black, 45 pounds molasses, and 20 gallons vinegar, of strength No. 24, in which 1 pound finely ground gum-arabic has been dissolved. The whole mixture, after being carefully triturated in a grinding mill, receives 12 pounds sulphuric acid, in small successive quantities, stirring strongly for half an hour. The stirring is continued for half an hour daily during a fortnight, and then 3 pounds of gum-arabic are added, after which the stirring is resumed, and continued as before for another fortnight. This gives fine liquid blacking; the paste is obtained within a week by withholding 8 of the 20 gallons in which the gum-arabic is dissolved.

Blackleg, a cattle disease. See BLACK QUARTER.

Blackmail, originally a certain rate of money, corn, cattle, or the like, anciently paid, in the north of England and in Scotland, to certain men who were allied to robbers, to be protected by them from pillage. It was carried to such an extent as to become the subject of legislation. Blackmail was levied in the districts bordering the Highlands of Scotland till the middle of the 18th century. In the United States, in common language, and in general acceptance, it is equivalent to, and synonymous with, extortion—the exaction of money, either for the performance of a duty, the prevention of an injury, or the exercise of an influence. It supposes the service to be unlawful and the payment involuntary. Not unfrequently it is extorted by threats, or by operating upon the fears or the credulity or by promises to conceal, or offers to expose, the weaknesses, the follies, or the crimes of the victim. There is moral compulsion, which neither necessity nor fear, nor credulity can resist. The New York statutes upon the subject have been adopted in substance by many other States of the Union. These statutes provide, substantially, that a person who knowing the contents thereof, and with intent, by means thereof, to extort or gain any money or other property, or to do, abet, or procure any illegal or wrongful act, sends, delivers, or in any manner causes to be forwarded or received, or makes and parts with for the purpose that there may be sent or delivered, any letter or writing, threatening to accuse any person of a crime, or to do any injury to any person or to any property, or to publish or connive at publishing any libel, or to expose or impute to any person any deformity or dis-

BLACKMAR—BLACKSNAKE

grace is punishable by imprisonment for a term, usually, not exceeding five years. In New York and in various other States it is also a misdemeanor for any person who, under circumstances not amounting to robbery, or an attempt at robbery, with intent to extort or gain any money or other property, verbally makes such a threat as would be criminal under the statute mentioned above, and it is immaterial whether a threat made as specified in the statute, is of things to be done or omitted by the offender, or by any other person.

Blackmar, Frank Wilson, economist: b. Springfield, Pa., 3 Nov. 1854. He graduated at the University of the Pacific 1881, and took his Ph.D. degree at Johns Hopkins 1889. Since 1889 he has been professor of sociology and economics in the University of Kansas. He has been a frequent contributor of articles and reviews to the journals devoted to history and economics. Publications: 'Federal and State Aid to Higher Education in the United States' (1890); 'Spanish Colonization in the Southwest' (1890); 'Spanish Institutions in the Southwest' (1891); 'The Story of Human Progress' (1896); 'History of Higher Education in Kansas' (1900); 'Charles Robinson: The Free State Governor of Kansas' (1900).

Blackmore, Sir Richard, English physician and poet: b. probably about 1650; d. 1729. In 1668 he entered the University of Oxford, and in 1674 took the degree of B.A. Having traveled abroad he took the degree of M.D. at Padua, and was admitted Fellow of the Royal College of Physicians in 1687. In 1697 he had risen to so much eminence as a physician as to be appointed physician to King William, who knighted him. In the preceding year he had made himself known as a poet by the publication of his heroic poem of 'Prince Arthur,' which was soon followed by 'King Arthur.' In 1700 he published a poem entitled a 'Satire on Wit,' in which he assailed his literary contemporaries on the score of irreligion and grossness. The worthy man became the common butt of his day, being attacked by Dryden, Pope, and Swift, not to mention others. The work which produced him the greatest reputation was 'The Creation,' a poem in seven books, which went through several editions, and was greatly applauded, but is, generally speaking, very tamely elaborate.

Blackmore, Richard Doddridge, novelist: b. Longworth, Berkshire, 9 June 1825; d. 20 Jan. 1900. He was educated at Tiverton School and Exeter College, Oxford, where he graduated in 1847. In 1852 he was called to the bar at the Middle Temple, and afterward practised as a conveyancer. His greatest literary success was 'Lorna Doone, a Romance of Exmoor' (1869), one of the best of modern romances. Other novels by him are: 'Clara Vaughan'; 'Cradock Nowell, a Tale of the New Forest'; 'The Maid of Sker'; 'Alice Lorraine, a Tale of the South Downs'; 'Cripps the Carrier'; 'Erema'; 'Mary Anerley'; 'Christowell'; 'Sir Thomas Upmore'; 'Springhaven'; 'Perlycross'; 'Darrel'; etc. He has also published a translation of Virgil's 'Georgics' (1862 and 1871). Among his volumes of original poetry are 'Poems by Melanther' (1854); 'The Bugle of the Black Sea' (1855); and 'The Fate of

Franklin' (1860). Mr. Blackmore's work is characterized by vivid and accurate descriptions of nature and of rural life. His male characters are well drawn, and, though not the products of subtle analysis, they are boldly marked and consistent; with his women, however, he is less successful. He is at his best in historical novels, such as 'Lorna Doone,' his greatest work, and 'Alice Lorraine.'

Blackpool, England, a town on the coast of Lancashire, between the estuaries of the Ribble and Wyre, 27 miles south-southwest of Lancaster, which has of late years attracted many visitors by its advantages as a watering-place. It affords excellent accommodation for visitors in the numerous hotels, hydropathic establishments, and lodging-houses, and consists of ranges of lofty houses about three miles long facing the sea, in front of which an excellent promenade and carriage drive extends along the whole distance. The town is abundantly supplied with the means of amusement and recreation, including theatres, concert rooms, fine winter gardens, aquarium, extensive pleasure-grounds, park of 60 acres, a great steel tower (Eiffel Tower), over 500 feet high, a gigantic wheel, and other common summer-resort attractions. There are also a court-house and three markets, several churches, and chapels of various denominations, libraries and news-rooms and free library. Blackpool was incorporated as a municipal borough in 1876. Pop. (1903) 48,000.

Blacksnake, or **Blue Racer**, a common colubrine serpent (*Zamenis constrictor*) found throughout the United States, and the adjacent parts of Canada. The typical eastern blacksnake is uniform lustrous black above, and slate-color beneath, the lower jaw, chin, and sometimes upper edges of the lip-plates white, the tongue black. Western specimens are bright olive-green, with the entire under surface greenish-white, varying to bright yellow, which accounts for the name, "blue" or "green racer," often heard in the Mississippi valley. The young, under 18 inches in length, are variegated with dark blotches upon olive, and light margins to the scales, especially on the sides. The female is larger than the male, but rarely if ever exceeds six feet in length. This is one of the most numerous and vigorous of American snakes, making its home in hollow stumps and underground dens. At the approach of winter, many are likely to gather together in similar retreats, and remain there in a torpid condition until spring, entangled into a ball, for the sake of mutual warmth. Its motions are of the swiftest, it being capable of running with great rapidity and of scaling trees, sometimes to a height of 100 feet above the ground, where it searches from branch to branch for birds' eggs, young squirrels, etc. It will even leap from tree to tree, often a distance of more than its own length; and it is also fond of water, where it swims proficiently. It seeks much of its food in swamps and along streams, mainly frogs, toads, eggs and young of birds, insects, and other snakes. Cope says: "The constricting power of blacksnakes is not sufficient to cause inconvenience to a man, but might seriously oppress a child. . . . It is easy to unwind the snake with the free hand and arm." The blacksnake is harmless, and its bite is no worse than

BLACKSTOCK HILL—BLACKSTONE RIVER

that of a mouse. It is readily tamed, and shows some intelligence. It is courageous and will sometimes attack an enemy, moving forward with the head raised a foot or two above the ground, and waving about with a most terrifying aspect. Its principal enemies are the badger and skunk, and it seems to hold a special animosity toward the copperhead and rattlesnakes, whose trail it follows, at night, by its power of scent; and having overtaken the object of its pursuit, it leaps upon it, avoiding its stroke by its swiftness, wraps itself about it, and slowly crushes its victim to death, after which it swallows it whole. The blacksnake breeds during the summer, the female laying 15 or 20 eggs at a time in the hollow of a sunny bank, or in the midst of a decayed stump, around which she stays, guarding her young until they reach a considerable age.

Several other species of the genus belong to the southwestern United States, Mexico, and the West Indies, and the Texan whipsnake (q.v.) is a near relative. The "chainsnake" is sometimes called "mountain blacksnake." Other blackish serpents known as blacksnakes include a colubrine of Jamaica (*Ocyophis ater*); the death adder (q.v.) of Australia and Tasmania, and some others notable for dark hues. One of the most widespread of the native names of the East Indian Cobra de Capello has the meaning "blacksnake." Consult: Cope, 'Snakes of North America.'

Blackstock Hill, South Carolina, a locality where, on 20 Nov. 1780, the patriots of the State, under Gen. Sumter defeated Tarleton's cavalry after a sharp encounter.

Blackstone, William, the first inhabitant of Boston, was an Episcopal minister, who settled there as early as 1625 or 1626, and died 26 May 1675, on Blackstone River, a few miles north of Providence. On the arrival of Gov. Winthrop at Charlestown, in the summer of 1630, it is stated in the records of that place that "Mr. Blackstone, dwelling on the other side of Charles River, alone, at a place by the Indians called Shawmut, where he only had a cottage, at or not far off from the place, called Blackstone's Point, he came and acquainted the governor of an excellent spring there, withal inviting himf and soliciting him thither; whereupon, after the death of Mr. Johnson and divers others, the governor, with Mr. Wilson, and the greatest part of the Church, removed thither." At a court held in April 1633, 50 acres of land near his house in Boston were granted to him forever. In 1634 he sold his land and became the first white settler within the present limits of Rhode Island.

Blackstone, Sir William, English lawyer, and the most popular writer on the laws and constitution of his country: b. London, 10 July 1723; d. 14 Feb. 1780. He was educated on the foundation of the Charter House, whence in 1738 he was removed to Pembroke College, Oxford. He was much distinguished, both at school and at the university, and at an early age compiled a work for his own use, entitled the 'Elements of Architecture,' which has been much praised. Having chosen the profession of the law, he was in due time entered at the Middle Temple, and on this occasion published the admired verses called the 'Lawyer's Farewell to His Muse,' which appeared in 'Dodsley's Mis-

cellany.' In 1743 he was elected Fellow of All-Souls College, Oxford, and in 1746 was called to the bar, and commenced the practice of law. Being deficient in elocution, and not possessed of the popular talents of an advocate, his progress was slow. Having attended the courts of law at Westminster for seven years, without success, he determined to quit the practice of his profession, and retire to his fellowship at Oxford. The system of education in the English universities supplying no provision for teaching the laws and constitution of the country, Blackstone undertook to remedy this defect by a course of lectures on that important subject; and the manner in which he executed the task has conferred a lasting distinction on Oxford. His first course was delivered in 1753, and was repeated for a series of years with increasing effect and reputation. These lectures doubtless suggested to Mr. Viner the idea of founding, by his will, a liberal establishment in the University of Oxford for the study of the common law; and Blackstone was, with great propriety, chosen the first Vinerian professor. His engagements at Oxford did not prevent his occasional practice as a provincial barrister; and in 1754, being engaged as counsel in a contested election for the county of Oxford, he was led into considerations on the elective franchise, which produced his work entitled 'Considerations on Copyholds.' In this treatise he denied the right of copyholders to vote as freeholders; which led to a declaratory act of Parliament in establishment of that narrow doctrine. In 1759 he published a new edition of the Great Charter and Charter of the Forest, with an historical preface; and during the same year, the reputation which he had obtained by his lectures induced him to resume his attendance at Westminster Hall, when business and the honors of his profession soon crowded in upon him. In 1761 he was elected member of Parliament for Hindon, made king's counsel and solicitor-general to the queen. About this time he also married, and thereby losing his fellowship, was appointed principal of New Inn Hall: which office, with the Vinerian professorship, he resigned the next year. In 1765 he also published the first volume of his 'Commentaries on the Laws of England'; a work of greater merit than any which had yet appeared on the subject. Notwithstanding some passages against standing armies, and in exposition of the progress of the influence of the Crown, Blackstone is uniformly the advocate of prerogative, and very confined in his notions of toleration. The real merit and talents of Blackstone, backed by political tendencies which are generally favorable to advancement, now made him an object of ministerial favor, and he was offered the post of solicitor-general in 1770, and, declining it, was made one of the justices of common pleas, which station he held until his death, in his 57th year.

Blackstone River, a river of eastern New England; rises in Paxton and Holden townships, Worcester County, Mass., flows southeast into the State of Rhode Island, and empties into the Providence River, near Providence, where it is known as the Seekonk. It is over 50 miles long, and falls over 700 feet, thus affording abundant water-power, and for a great part of its course flows through an almost continuous village of manufacturing establishments.

BLACKTAIL—BLACKWELL

Blacktail, the name of two different species of western American deer, notable for the blackness of the tail as compared with the snowy white tail of the eastern or "white-tailed" deer. One of them is more suitably called "mule" deer, and is described elsewhere under that title. The other is the Columbian or Pacific Coast deer (*Cervus*, or *Odocoileus columbianus*).

The Columbian blacktail is somewhat smaller than the mule deer, with relatively shorter ears and finer hair. The general color in summer is red or reddish-yellow; in winter the color is more varied. The coat is then brownish-gray, darkest along the spine; top of head, chestnut and black; face gray, with a black spot on the forehead, passing backward as a stripe over each eye; chin white, behind which is a black patch; upper throat, posterior portion of under part, and base of tail, white; chest, sooty; legs, dark cinnamon, white inside, and rest of under parts covered with black; upper surface of the tail, black. The antlers of the buck resemble those of the mule deer. This deer is limited to the Pacific coast, from central California northward to Alaska, and does not pass east of the coast ranges of mountains. It is a deer of the woods, frequenting the foot-hills and valleys especially those covered with small brush; and its habits and gait, more nearly resemble those of the white-tailed deer, than of the mountain-loving mule deer. Its hunting affords excellent sport, and its venison is highly prized. Consult: Farrell, 'Big Game in North America' (edited by Shields, Chicago); and VanDyke, 'The Deer Family.'

Blackthorn, a shrub or small tree. See CRATÆGUS.

Blackwater Fever, an obscure disease of uncertain causation that is prevalent in Africa, and is said to be present in other parts of the world. By many it is regarded as a very severe form of malaria, a malignant form, associated with great prostration and with bloody urine. By others it is considered a disease of itself and due to a special parasite of the blood. The question will undoubtedly be settled within a short time as soon as skilled physicians have the opportunity of studying the disease in Africa.

Blackwell, Mrs. Antoinet Louisa (BROWN), American woman suffragist and Unitarian minister: b. Henrietta, N. Y., 20 May 1825. A graduate of Oberlin (1847), she "preached on her own orders," at first in Congregational churches, becoming at length a champion of women's rights. She married Samuel C., a brother of Dr. Elizabeth Blackwell (1856). She has written 'Shadows of Our Social System' (1855); 'The Island Neighbors' (1871), a novel of American life; 'Sexes Throughout Nature' (1875), etc.

Blackwell, Elizabeth, the first woman who ever received the degree of M.D. in the United States: b. Bristol, England, 3 Feb. 1821. Elizabeth, a girl of 17 years at the time of her father's death, and one of the elder of nine children, opened a school, which she conducted successfully for several years. But her energetic temperament and strong desire for the acquisition of knowledge demanded a wider field; and long reflection having persuaded her that some avenue should be opened to women whom either necessity or choice impelled to gain a subsistence by their own exertions, she felt that

her path of duty lay in that direction. She resolved to become a physician, and to return again to teaching to acquire the requisite means of education. A situation as governess was found in the family of Dr. John Dixon, of Asheville, N. C., where she remained a year, having access, during that time, to a medical library, and receiving from Dr. Dixon some direction as to her reading, but no encouragement in her purpose. At the end of the year she removed to Charleston, S. C., still acting as a teacher of music, but pursuing her studies with the aid and sympathy of Dr. S. H. Dixon, subsequently professor of the institute and practice of medicine in the University of New York. Miss Blackwell next went to Philadelphia, and passed six months in study under Dr. Allen and Dr. Warrington, of that city. During that time she made formal application to the medical schools of Philadelphia, New York, and Boston, for admission as a student. In each instance the request was courteously but firmly denied, on the ground of a want of precedent for such an admission, and of the impropriety of such an innovation upon established custom. Several of the professors, however, avowed a sincere interest in her hopes and purposes, and some of them urged her to seek admission into one or another of the schools under the disguise of a feigned name and male attire. She declined to take into consideration any such suggestion, for, though anxious to obtain a medical education for herself, she was hardly less desirous of asserting her right to it as a woman. Undismayed by these difficulties, however, she next made application to 10 other medical schools in different parts of the country, which was rejected by all except those at Geneva, N. Y., and at Castleton, Vt. At Geneva, the faculty, after expressing their own acquiescence, laid the proposition before their students, leaving the decision with them. The young men unanimously assented to the reception of the new pupil, and pledged themselves that no conduct of theirs should ever cause her to regret the step she had taken. It is to their credit that they faithfully observed this pledge during the two subsequent collegiate years that she passed among them. Here Miss Blackwell took her degree of M.D., in regular course, in January 1849. During her connection with the college, but when not in attendance there upon lectures, she pursued a course of clinical study in Blockley Hospital, in Philadelphia. The spring after her graduation she went to Paris and remained six months as a student in the Maternité, devoting herself to the study and practice of midwifery. The next autumn she was admitted, as a physician, to walk the hospital of St. Bartholomew, in London, where she could not have been received as a student. After nearly a year spent in St. Bartholomew's she returned to New York, where she practised her profession with credit and success, and established the New York Infirmary for Women and Children, and the Woman's Medical College. In 1859 she registered as a physician in England, and since 1869 has practised in London and Hastings; she founded the National Health Society in London, and assisted in founding the London School of Medicine for Women. Her works include: 'Physical Education of Girls'; 'Religion of Health'; 'Counsel to Parents on Moral Education'; 'Pioneer in Opening

the Medical Profession to Women'; 'The Human Element in Sex'; 'Decay of Municipal Representative Institutions.'

Blackwell, Lucy Stone. See **STONE, LUCY B.**

Blackwell, Thomas, Scottish writer: b. Aberdeen, 4 Aug. 1701; d. Edinburgh, 1757. After receiving the rudiments of his education at the grammar-school of his native city, he entered Marischal College, where he took the degree of A.M. in 1718. A separate professorship of Greek had not existed in this seminary previous to 1700. Blackwell, having turned his attention to Greek, was honored in 1723, when only 22 years of age, with a Crown appointment to this chair. His 'Inquiry into the Life and Writings of Homer' was published at London in 1737. A second edition of the work appeared in 1746, and shortly after 'Proofs of the Inquiry into Homer's Life and Writings.' In 1748 he published anonymously 'Letters Concerning Mythology.' In the course of the same year he was advanced to be principal of his college. In 1750 he opened a class for the instruction of the students in ancient history, geography, and chronology. In 1752 he obtained the degree of LL.D., and in the subsequent year published, in quarto, the first volume of 'Memoirs of the Court of Augustus.' A second volume appeared in 1755, and a third, which was posthumous, and left unfinished by the author, was prepared for the press by John Mills, Esq., and published in 1764.

Blackwell's Island, an island in the East River belonging to New York city. It has an area of about 120 acres, and contains the penitentiary, almshouse, lunatic asylum for females, workhouse, blind asylum, hospital for incurables, and a convalescent hospital. Nearly all of these buildings were erected from granite quarried on the island, by convict labor, the style of architecture being of a turreted and battlemented design of the feudal character. The island is bordered by a heavy granite sea wall, also built by the convicts, and a large amount of farming and gardening is carried on by inmates of the penitentiary.

Blackwood, Adam, Scottish writer: b. Dunfermline, 1539; d. 1613. Scotland, during his youth, was undergoing the agonies of the Reformation. He therefore found it no proper sphere for his education, and went to Paris, where, by the liberality of his youthful sovereign, Queen Mary, then residing at the Court of France, he was enabled to complete his studies, and to go through a course of civil law at the University of Toulouse. Having now acquired some reputation for learning and talent, he was patronized by James Beaton, the expatriated Archbishop of Glasgow, who recommended him very warmly to Queen Mary and her husband the dauphin, by whose influence he was chosen a member of the Parliament of Poitiers, and afterward appointed to be professor of civil law at that court. His first work was one entitled 'De Vinculo Religionis et Imperii, Libri Duo' (Paris 1575), to which a third book was added in 1612. His next work was entitled 'Apologia pro Regibus,' and professed to be an answer to George Buchanan's work, 'De Jure Regni apud Scotos.' He next published, in French, an account of the death of his benefactress, Queen Mary, under the title, 'Martyre de Maria Stuart Reyne d'Escoce' (Antwerp, 8vo. 1588).

At the end of the volume is a collection of poems in Latin, French, and Italian, upon Mary and Elizabeth; in which the former princess is praised for every excellence, while her murderess is characterized by every epithet expressive of indignation and hate. In 1644, 30 years after his death, appeared his 'Opera Omnia,' in one volume, edited by the learned Naudeus, who prefixes an elaborate eulogium upon the author.

Blackwood, William, Scottish bookseller, known as the projector and publisher of 'Blackwood's Magazine': b. Edinburgh, 20 Nov. 1776; d. 16 Sept. 1834. He settled in his native city as a bookseller in 1804, and soon added the trade of a publisher to his original business. The first number of 'Blackwood's Magazine' appeared on 1 April 1817, and from the first was conducted in the Tory interest. It was started just at the time when the general peace which had been established in Europe was beginning to reanimate the hopes of the Whigs, and when it was all the more necessary for the Tories to defend by the press that preponderance which they still held in Parliament. Mr. Blackwood was fortunate enough to secure as his coadjutors in his new literary undertaking most of the leading authors of the day belonging to the Tory party, among them Sir Walter Scott, John Gibson Lockhart, Hogg (the Ettrick Shepherd), Prof. Wilson (Christopher North), De Quincey (the English Opium-eater), and others. All that was connected with the management of the magazine he took into his own hands, and he himself selected the articles for each number — a task for which he was admirably qualified, for although he wrote little himself, he was an admirable judge of literary works. The new magazine on its first appearance entered upon a campaign against the Edinburgh 'Review,' combating both its political views and its literary decisions. From the first it attracted a great deal of attention, and its success was decided by the appearance of the 'Noctes Ambrosianæ,' a series of articles in the form of dialogues, in which the current questions in politics and literature were discussed with the most pungent sarcasm and inexhaustible humor. The brilliant articles of Dr. Maginn added not a little to its reputation, and constantly, as the original contributors withdrew, new and valuable accessions were made to the staff of its supporters. After his death his business continued to be carried on by his sons, and the magazine, although it has perhaps lost some of its former reputation (or notoriety), still keeps its place as one of the leading periodicals.

Blackwood. See **DALBERGIA.**

Blackwood's Magazine. See **BLACKWOOD, WILLIAM.**

Bladder, the muscular organ that in man and the lower animals holds the urine. The kidneys secrete urine constantly, the bladder stores it and only empties itself at more or less definite intervals. In man the bladder is a flattened rounded to conical organ about the size of an orange, and holding under normal conditions about 16 ounces of urine (one pint). It is situated in the lower portion of the abdominal cavity just behind the pubic bone, which serves as a protection. Its general shape is rounded triangular, the flat side being above, the ureters leading from the kidneys entering at the corners; the pointed end corresponding to the

BLADDER-NUT — BLADDERWORM

opening into the urethra, through which canal the urine is voided. The walls of the bladder are made up of several layers; the outer wall is of peritoneum in part, or serous and connective tissue combined. The greater part of the wall is made up of involuntary muscle fibre, arranged longitudinally and circularly; the innermost coat is thin and delicate,—the mucous membrane,—and is lined throughout by layers of regularly flattened squamous epithelial cells. The nervous supply of the bladder, by means of which it is emptied, is complex and probably threefold. It is under the influence of the sympathetic nervous system of the hypogastric plexus; there are subsidiary centres in the spinal cord and higher up in the human cortex certain voluntary efforts have their influence on the bladder control. The primary centres of control are in the sympathetic. These cause the bladder in the young infant and also in the patient whose spinal cord and centres are diseased to be emptied and in the so-called irritable bladder it is probable that this part of the mechanism is mostly affected.

There is a very marked relation between the skin activities and the kidney and bladder action, for while the skin is acting freely as in exercise in warm weather, a large amount of water is thus given off, which in cold weather is eliminated through the kidneys and thus by the bladder. This is noted daily when in cold weather one leaves the warm house and shortly after walking in the cold of the outside air, the desire to urinate becomes urgent. Irritability of the bladder, particularly in children, and bedwetting is often a very troublesome complaint. It may be due to a variety of causes, excessive irritation, however, would probably not result in bedwetting, particularly in older children, if the control (inhibition) normally maintained by the brain were not cut off by deep slumber. The treatment is always medical and is often very difficult. Infection of the bladder frequently occurs and leads to many serious complications. (See CYSTITIS.) Stones also develop in the bladder. (See URINARY CALCULUS.) Paralysis of the bladder *per se* is a rare affection; paralysis of the sphincter that controls the outlet may result from a variety of causes. It usually results in incontinence of urine. Retention is an opposite condition and is frequently due to loss of sympathetic nerve action, such as follow labor, or an operation, or from the anæsthesia of opium, belladonna, or similar narcotics. It may also be due to mechanical obstruction, in old men, particularly being due to an hypertrophied prostate gland.

Bladder-nut (*Staphylea*), the type genus of the order *Sapindaceæ*, consisting of eight species of ornamental shrubs or small trees, natives of the northern hemisphere. The common bladder-nut (*S. pinnata*) a native of Europe and Asia, which attains a height of 15 feet, and is often planted for ornament, bears panicles of whitish flowers in late spring. The American bladder-nut (*S. trifolia*), which ranges from Quebec to Minnesota and southward to South Carolina and Missouri, bears nodding panicles or umbel-like racemes of white flowers and, like several of the other species, is used in shrubberies. The wood of the two species mentioned is white and hard and is used in turning. The flower buds are pickled like capers and the seeds sometimes eaten. The common name is suggested by the inflated capsule and the hard shell

of the seed; the specific name by the resemblance of the raceme to a bunch of grapes, the staphyle of the Greek language.

Bladderworm, *Cysticercus* or immature stage of the tapeworm, the hydatid of physicians. By far the most injurious species is *Tania echinococcus*, more frequently causing death than any other entozoon. In its adult or strobila state this worm only infests the dog and wolf, but its larva, the hydatid of physicians, frequently occurs in the human body. It is very small, seldom exceeding six millimetres in length, there being but four segments, including the head, which has a pointed rostellum, with a double crown of large-rooted hooks; there are four suckers present, and the last segment, when sexually mature, is as long as the anterior ones taken together. The hydatid (*Proscotex*) forms large proliferous vesicles, in which the scolices (echinococcus heads) are developed by budding internally. About 5,000 eggs are developed in a single segment (*Proglottis*). The six-hooked embryos develop, are expelled from the dog, and find their way in drinking water or in food into the human intestines, whence they bore into the liver, their favorite habitat, or are carried along the blood vessels into some other organ, where they develop into bladder-like bodies, called hydatids. In its earliest stages the hydatid is spherical and surrounded by a capsule of condensed connective tissue of its host. By the fourth week the young *F. echinococcus* is one-fiftieth of an inch long, and it is probably many months before the echinococci heads are entirely developed. When this stage is reached the tapeworms become sexually mature in from seven to nine weeks after, when the milk-white worms may usually be found imbedded in the mucus of the duodenum and upper part of the small intestines, with their heads attached to the villous surface of the intestine. The hydatids or cysts in which the echinococci develop are of three kinds,—exogenous, endogenous, and multilocular,—and lie imbedded in the parenchyma of the liver, etc., and are filled with a clear amber-colored fluid. The echinococcus heads, first on the inner surface of the cyst and in the interior of the echinococcus head (brood-capsule), develops a second brood of scolices, contained in a secondary cyst. Finally, a tertiary cyst, containing tertiary or granddaughter scolices, arises. In such cases the number of tapeworms which arise from one embryo is naturally enormous, and the parent vesicle may reach a very considerable size, being sometimes as large as a man's head. In consequence of this enormous growth the vesicles frequently obtain an irregular shape; while on the other hand the tapeworms which develop from them remain very small, and carry, as a rule, only one ripe proglottis. Sometimes the secondary hydatids will develop scolices and granddaughter vesicles before the original maternal hydatid has acquired echinococcus heads.

So long as the tapeworm head (*scolex*) remains attached to the body of the bladder-worm and in the host of the latter, it never develops into a sexually mature tapeworm; although in many cases it grows to a considerable length (*Cysticercus fasciolaris* of the house-mouse). The bladderworm must enter the alimentary canal of another animal before the head can, after separation from the body of the bladderworm, develop into the sexually mature tapeworm. This

BLADDERWORT — BLAINE

transportation is effected passively, the new host eating the flesh or organs of the animal infected with *Cysticerci*. The tapeworms, therefore, are principally found in the *Carnivora*, the *Insectivora*, and the *Omnivora*, which receive the bladderworms in the flesh of the animals on which they feed. The vesicles are digested in the stomach, and the cestode head becomes free as a scolex. The latter is, perhaps, protected from the too intense action of the gastric juice by its calcareous concretions, and at once enters the small intestine, fastens itself to the intestinal wall, and grows by gradual segmentation into a tapeworm. From the scolex the chain of proglottides proceeds as the result of a growth in length accompanied by segmentation, a process which is to be looked upon as a form of asexual reproduction (budding in the direction of the long axis). The development of the scolex is then to be explained as a metamorphosis, characterized by the individualization of certain stages of the development. But the whole life-history is a case of metagenesis, inasmuch as the sexual proglottides alternate with the asexual scolex. See TAPEWORM.

Bladderwort, *Utricularia*, a genus of about 150 species of largely aquatic herbs of the natural order *Lentibulariaceae*, widely distributed throughout the world, but especially abundant in the tropics. The aquatic species are remarkable for the little, sometimes valved, bladders which entrap and digest aquatic insects and other water animals. The bladders which are at first filled with water become inflated with air at flowering time so that the flower instead of being submerged like the rest of the plant, is raised above the surface until after blossoming, when water again fills the bladders, the plants sinking to the bottom, where the seeds are ripened. These aquatic species, of which about a dozen with yellow or blue flowers are natives of the United States, are common in ditches, ponds, and marshes throughout the world. They are sometimes cultivated in aquaria more as curiosities than for any intrinsic beauty. In the marsh species the bladders are less effective and numerous than in the pond species, and in the terrestrial kinds they are small, abortive, and useless. These last have leaves of ordinary forms and are often tuberous, whereas members of the first group have much dissected foliage like other pond plants and are rootless. Some of the tropical species are showy epiphytes and are cultivated in hot-houses like orchids, with some of which they compare in beauty. Consult: Bailey, 'Cyclopedia of American Horticulture' (1900-2).

Bladensburg, Maryland, a small town in Prince George County, on the east branch of the Potomac, about six miles east from Washington, with a population in 1900 of 463. At the bridge over the Potomac west of Bladensburg, the battle with the English which preceded the capture of Washington, took place toward the latter part of the War of 1812, Gen. Ross and Admiral Cockburn with about 5,000 men, appeared in Chesapeake Bay to attack Washington. The American forces fell back to Bladensburg and awaited the British. The Americans numbered about 7,000, but were scattered and untrained. On 24 Aug. 1814, the British advanced to the attack. The American artillery held them in check for a time, but the troops pushed forward.

The Americans fled in wild disorder; the confusion spread and soon Gen. Winder, the American commander, gave orders for a general retreat. The American loss was 76 men; the British more than 500 killed and wounded. Bladensburg is famous in American history as the site of the duelling ground, where many famous duels growing out of quarrels in Washington were fought, as that in which Barron killed Decatur in 1820.

Blagoveshtchensk, blā - gö - vyěsh'chěnsk, Russia, a town of eastern Siberia, capital of the province of the Amoor, and of the general government of the Amoor, on the river Amoor, where it receives the Zeya, near the Chinese town of Aigoon. Founded as a military post in 1856 it is now an important place, with secondary schools, theological seminary, etc. Pop. (1903) 37,841.

Blaikie, William, American athlete and writer on physical training: b. York, N. Y., 1843. He became a lawyer in New York. He has written 'How to Get Strong' (2d ed. 1880); 'Sound Bodies for Our Boys and Girls' (1883).

Blaikie, William Garden, Scotch clergyman: b. Aberdeen, 1837; d. 11 June 1899. He was graduated at the University of Aberdeen; ordained a minister of the Established Church in 1842; joined the Free Church in 1843; and was appointed professor of apologetics and pastoral theology in New College, Edinburgh, 1868. He was a delegate to the Presbyterian General Assembly of the United States in 1870; took a leading part in the formation of the Alliance of the Reformed Churches; and was editor of the 'Free Church Magazine' in 1849-53; the 'North-British Review' in 1860-3; the 'Sunday Magazine' in 1871-4; and the 'Catholic Presbyterian' in 1879-83. His writings include 'Bible History in Connection with General History' (1859); 'Bible Geography' (1860); 'Glimpses of the Inner Life of David Livingstone' (1880); 'Public Ministry and Pastoral Methods of Our Lord' (1883); 'Leaders in Modern Philanthropy' (1884), etc.

Blaine, Ephraim, American soldier: d. Carlisle, Pa., 1808. He entered the army as a colonel, at the commencement of the Revolutionary War, and was subsequently made commissary-general. His services were gallant and patriotic. He was with Washington in many of the most trying scenes of the Revolution, and enjoyed the confidence of his chief to the fullest extent. During the "dark winter" at Valley Forge, the preservation of the American army from starvation was in a great degree owing to the exertions and sacrifices of Col. Blaine.

Blaine, James Gillespie, American statesman: b. West Brownsville, Pa., south of Pittsburg, 31 Jan. 1830; d. 27 Jan. 1893. His father, a cultivated landowner, was a Presbyterian of Scotch-Irish blood; his mother was a Catholic. He was a precocious boy with a strong taste for history and literature, and the star of his debating club as orator and parliamentarian. At 13 he entered Washington College in his native county, graduated at 17, and after teaching and studying law, removed to Augusta, Me., in 1854. He entered journalism and politics, joined the new Republican party the next year, was a delegate to its first (Fremont) convention in 1856, and in 1858 became chairman of the State

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Republican committee—an extraordinary position at 28 after but four years' residence. He remained such for 20 years, the almost omnipotent dictator of the party's State action. In 1858, also, he was elected to the legislature, and re-elected three more terms, being speaker the last two; and in 1862 was sent to Congress, and re-elected six additional terms to the House. In the House he was the most effective and dexterous of debators, an adept at parliamentary law, of instant readiness and endless resource; and outside he became early the most captivating, magnetic, and brilliant of party leaders. With a prodigious and instant memory both for facts and faces, saturated with political history and the records of all prominent public men, with great charm of utterance and exuberant geniality of manner, he excited in the mass of his party the most enthusiastic devotion; but unfortunately in the "independent" wing an equally invincible distrust, which ultimately defeated his most cherished ambition. As congressman, his most noted positions were opposing Thaddeus Stevens' reconstruction plans for putting the South under military government, and of cutting down the representation of the States when readmitted to a basis of legal voters; opposing the payment of the public debt in greenbacks; and supporting the agitation which led to Great Britain's admitting her citizens' right to change their allegiance (1870). From 1869 to 1874 he was speaker, and gained the highest reputation for parliamentary ability, firmness, impartiality, and dispatch of business. The tremendous reaction of 1874 against Grant's second term swept the Democrats into control of the House by an immense majority, and Mr. Blaine became the leader of the Republican minority. An envenomed struggle at once began. As a matter of party tactics, and to pave the way for the election of 1876, Mr. Blaine sought to inflame Republican feeling by dwelling on the harshest memories of the war; the Democrats retorted by a series of attacks on his personal integrity in the speakership, as evidence of which they cited letters to a Boston broker which had been kept by a clerk named Mulligan. (See MULLIGAN LETTERS.) He exhibited and read the letters on the floor of the House to prove that they contained nothing discreditable; but the charges, in the hands of his enemies, remained one of the influences which twice lost him the nomination and at last the election to the presidency. In 1876 he received 285 votes, much the largest single vote, on the first ballot at the Republican convention, and 351 on the seventh; his imminent success then produced a coalition on Gen. Hayes. Senator Morrill of Maine becoming secretary of the treasury, Mr. Blaine was chosen senator for the unexpired term, and the following winter for the full term. He opposed the electoral commission on the ground that Congress was conferring powers beyond its own; opposed Hayes' withdrawal of the troops that upheld the carpet-bag governments; opposed the Bland Silver Bill and the adoption of the gold standard alike, believing bimetalism feasible and preferable; advocated ship subsidies, and rigid prohibition of Chinese immigration. In 1880 the attempt at a third term for Grant was defeated by the Blaine forces, who gave him 284 on first ballot; but after six days and 35 ballots, seeing that Blaine could not be nominated, united with the Sherman party to nominate Garfield,

by 399 to Grant's 306. Garfield made him secretary of state, and in his short tenure he planned a Pan-American Congress, attempted mediation between victorious Chile and crushed Peru, and attempted to cancel the Clayton-Bulwer Treaty (q.v.). But the speedy assassination of Garfield, and the accession of Arthur, the lieutenant of Blaine's mortal enemy, Roscoe Conkling, made his place untenable, and on 19 December he resigned. He at once began his two-volume 'Twenty Years in Congress,' a work of great charm and value; issuing the first volume in 1884, in time to do good work conciliating support for the next election. But meantime a memorable political letter to a New York State friend, widely published, was taken as a cue to his adherents in that State to vote against the administration candidate; and caused such a heavy fall in the Republican vote for governor that S. J. Folger, secretary of the treasury, was overwhelmed, and Grover Cleveland, the mayor of Buffalo, in high repute for having crushed a ring of plunderers there, was elected by 192,000 plurality. This unprecedented victory in the largest State of the Union gave Mr. Cleveland the Democratic nomination for President in 1884; and when Mr. Blaine was at last nominated by the Republicans (541 out of 813 on fourth ballot), the Independents carried out the threat of many years by bolting the nomination and mostly voting for Cleveland, who carried New York by 1,047 and with it the electoral majority. After his defeat he issued the second volume of his work (1886), and the next year a volume entitled 'Political Discussions.' Again a candidate in 1888, he withdrew in favor of Harrison, and was made secretary of state once more; he resumed his Pan-American policy, made a futile attempt to induce Great Britain to join in preserving the seals from extermination (see *BERING SEA QUESTION*), and favored a reciprocity commercial policy which made many of his old opponents draw toward him. He resigned in June 1892, in hope of securing the next Republican nomination, but found it out of the question. He died early the following year, of Bright's disease. His life was written by his kinswoman, Gail Hamilton (1895).

Blainville, Henri Marie Ducrotay de, *ôñ-rē mã-rē dü-krō-tā dé*, French naturalist: b. Arques, near Dieppe, 1778; d. 1 May 1850. He studied medicine and the allied sciences at Paris, and obtained his degree of M.D. in 1808. He was for a time assistant to Cuvier, whose influence helped to place him in the chair of anatomy and zoology in the Faculty of Sciences at Paris in 1812. Unfortunately misunderstandings soon arose between the master and his comparatively youthful rival, and ultimately terminated in an open rupture. In 1825 Blainville was admitted to the Academy of Sciences as the successor of Lacépède, and on the death of Lamarck in 1829, the chair which he held in the Museum of Natural History having been divided, the department of mollusca, zoophytes, and worms was committed to Blainville, whose important works on these groups made it impossible to confer it on any other. In 1832 he quitted this department to become the not unworthy successor of Cuvier in the chair of comparative anatomy in the same establishment. His works, contained both in the more important collections of the period, and in separate treatises, are too numerous to be enumerated,

but mention is especially due to 'L'Organisation des Animaux, ou Principes d'Anatomie Comparée' (1822); 'Manuel de Malacologie et de Conchyliologie avec Atlas de 100 Planches' (1825); 'Cours de Physiologie Générale' (1829-32); 'Manuel d'Actinologie' 1834); 'Sur les Principes de la Zooclassie' (1847); and above all, the gigantic but unhappily unfinished work entitled 'Ostéographie ou Description Iconographique Comparée du Squelette et du Système Dentaire des Cinq Classes d'Animaux Vertébrés, Récents et Fossiles' (1839-50).

Blair, Andrew Alexander, American chemist: b. Kentucky, 20 Sept. 1848. He graduated at the United States Naval Academy, 1866; was chief chemist to the United States Commission to test iron, steel, and other metals, 1875-8, and to the United States Geological Survey and 10th census, 1879-81. Since then he has been engaged in general practice. Besides reports to the government and contributions to scientific journals he has published 'The Chemical Analysis of Iron: Complete Account of all the Best-Known Methods for the Analysis of Iron, Steel, etc.' (Phila. 1888).

Blair, Austin, American lawyer: b. Caroline, N. Y., 8 Feb. 1818; d. Jackson, Mich., 6 Aug. 1894. He graduated at Union College in 1839; studied law in Oswego, N. Y., and removed to Jackson, Mich., where he was admitted to the bar in 1842. He was elected to the legislature in 1846; became conspicuous in the convention which established the Republican party in Michigan; and was elected governor of Michigan in 1860. He was a member of Congress (1866-70).

Blair, Francis Preston, American journalist and politician: b. Abingdon, Va., 12 April 1791; d. Silver Spring, Md., 18 Oct. 1876. In early life he was a Jacksonian Democrat. He edited the *Washington Globe* from 1830 to 1845. Through his anti-slavery sentiments he became one of the founders of the Republican party, but in later years returned to the Democratic faith.

Blair, Francis Preston, Jr., American soldier and statesman (son of the preceding): b. Lexington, Ky., 19 Feb. 1821; d. St. Louis, Mo., 5 July 1875. He was a representative in Congress from Missouri (1857-9 and 1861-3); became a major-general in the Union army in the Civil War, taking an active part in the Vicksburg campaign and Sherman's march to the sea; was an unsuccessful Democratic candidate for Vice-President in 1868, and United States senator (1870-3).

Blair, Henry William, American legislator: b. Campton, N. H., 6 Dec. 1834. He received an academic education; was admitted to the bar in 1859; served through the Civil War, becoming lieutenant-colonel of the 15th New Hampshire Volunteers, and was twice wounded. After serving in both branches of the State legislature he was a member of Congress (1875-9 and 1893-5), and United States Senator (1879-80). He is the author of what was known as the "Blair Common School Bill," designed to distribute a certain amount of Federal money for educational purposes among the various States in proportion to the number of illiterates. He was a strong opponent of Chinese immigration, and, when he was appointed and confirmed United States minister to China,

that government objected to receiving him. He has been an active worker in the cause of temperance and other reforms.

Blair, Hugh, Scottish divine: b. Edinburgh, 7 April 1718; d. 27 Dec. 1800. He commenced his academic career at Edinburgh University in 1730. In 1741 he was licensed as a preacher, and the following year was ordained to the parish of Collessie, Fife, but a few months after he was elected to the second charge of the Canongate, Edinburgh. In 1754 he received one of the city charges, that of Lady Yester's church, and in 1758 one of the charges of the High Church. In 1759 he commenced a course of lectures to students upon the principles of literary composition; and in 1762 he was made professor of rhetoric and belles-lettres in the University of Edinburgh, being the first that ever occupied this chair. He continued the course till 1783, when he published his lectures, which received very high praise. In 1763 he published a dissertation on the 'Poems of Ossian,' in the authenticity of which he firmly believed.

It was not till 1777 that he could be prevailed upon to offer to the world any of those sermons with which he had so long delighted a private congregation. One of the sermons having been sent by Strahan, the king's printer, to Dr. Johnson for his opinion, Strahan received from him the following characteristic note: "I have read over Dr. Blair's first sermon with more than approbation; to say it is good is to say too little." Strahan thereupon agreed to purchase the volume, with Mr. Cadell, for \$500. The sale was so rapid and extensive, and the approbation of the public so high, that the proprietors voluntarily doubled the stipulated price. The volume speedily fell under the attention of George III., and by royal mandate a pension of \$1,000 a year was bestowed on Dr. Blair. During the subsequent part of his life Dr. Blair published three other volumes of sermons; and it might safely be said that each successive publication only tended to deepen the impression produced by the first.

Blair, James, American clergyman and educator: b. Scotland, 1656; d. Williamsburg, Va., 1 Aug. 1743. In 1685 he was sent as a missionary to Virginia by Dr. Compton, Bishop of London. There he secured the confidence of the planters, and proved himself far in advance of his contemporaries on the question of slavery. In 1689 Sir Francis Nicholson appointed him "commissary," the highest ecclesiastical office in the colony. This office gave him a seat in the Council of the colonial government; he presided over the trials of clergymen, and pronounced sentence upon conviction of crimes or misdemeanors. His great desire was to see a college established in the colony. The Assembly and governor warmly sympathized with his project; he went to England and laid his plan before William and Mary, and on 14 Feb. 1692, a charter for the college was granted, the bishop of London being appointed chancellor and Blair president, and the institution named "William and Mary." Its opening was repeatedly delayed, and Blair did not enter on his duties as president until 1720, but his enthusiasm never wavered, and his efforts were finally crowned with success. He left his library to the college. He wrote 'Our Saviour's Divine Sermon on the Mount' (London 1722, 4 vols.; 3d ed. 1740), a

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work highly considered throughout the 18th century.

Blair, John, Scotch chronologist and geographer: d. 24 June 1782. He went to London about the middle of the 18th century. In 1754 the publication of a work in folio, entitled 'The Chronology and History of the World from the Creation to 1753 A.D.,' gained him great reputation. He dedicated his work to Lord Chancellor Hardwicke, and in 1757 was appointed chaplain to the Princess Dowager of Wales, and mathematical tutor to the Duke of York, whom he accompanied, in 1763, on a tour to the Continent, having already received several ecclesiastical preferments. On his return to England he published, in 1768, a new edition of his 'Chronological Tables,' with 14 maps of ancient and modern geography annexed.

Blair, John Insley, American philanthropist: b. Belvidere, N. J., 22 Aug. 1802; d. 2 Dec. 1899. In early life he was a merchant and banker; subsequently becoming the individual owner of more miles of railroad property than any other man in the world. He acquired a very large fortune; loaned the Federal government more than \$1,000,000 in the early part of the Civil War; built and endowed at a cost of more than \$600,000 the Presbyterian Academy in Blairstown, N. J.; rebuilt Grinnell College, Iowa; erected Blair Hall and made other gifts to Princeton University; was equally liberal to Lafayette College; and had erected more than 100 churches in different parts of the West, besides laying out many towns and villages on the lines of his numerous railroads.

Blair, Montgomery, American lawyer: b. Franklin County, Ky., 10 May 1813; d. Silver Springs, Md., 27 July 1883. He was graduated at the United States Military Academy in 1835; resigned from the army, 1836; was admitted to the bar, 1839, and began practice in St. Louis. He was judge of the court of common pleas, 1843-9; removed to Maryland in 1852; was United States solicitor in the court of claims, 1855-8. He acted as counsel for the plaintiff in the widely known Dred Scott case. In 1861-4 he was postmaster-general. In 1876-7 he acted with the Democratic party in opposing Hayes' title to the office of President.

Blair, Robert, Scotch clergyman and poet: (eldest son of the Rev. David Blair, one of the ministers of Edinburgh, and chaplain to the king): b. Edinburgh, 1699; d. Athelstaneford, 1746. He was ordained, in 1731, minister of Athelstaneford, in East Lothian, where he spent the remainder of his life. He was a man of learning and of elegant taste and manners. A botanist and florist; he was also skilled in optical and microscopical knowledge, on which subjects he carried on a correspondence with some learned men in England. He was a man of sincere piety and very assiduous in discharging the duties of his clerical functions. His best-known poem, 'The Grave,' was chiefly composed before his ordination. It was first printed in 1743, and is now esteemed as one of the standard classics of English poetical literature, in which rank it will probably remain longer than many works of greater contemporary or even present fame.

Blake, Edward, English statesman: b. Cairngorm, Ont., Canada, 13 Oct. 1833. He was

educated at Upper Canada College and Toronto University; was called to the bar in 1856 and engaged in practice in Toronto. He entered public life in 1867; was premier of Ontario, 1871-2; minister of justice, 1875-7, and the recognized leader of the Canadian Liberal party, 1880-91. He declined the appointments of chancellor of upper Canada in 1869, chief justice of Canada in 1875, and chief justice of Ontario in 1897, and also the honor of knighthood. In 1892 he was invited by the leaders of the Anti-Parnellites in Ireland to enter the British House of Commons as the representative of an Irish constituency. Consenting, he removed to South Longford, was elected for that district, and in 1895 was re-elected. In 1896 he was appointed a member of the judiciary committee of the privy council.

Blake, Eli Whitney, American inventor: b. Westboro, Mass., 27 Jan. 1795; d. New Haven, 17 Aug. 1886. He graduated at Yale University in 1816, and began business with his uncle, Eli Whitney, in the manufacture of fire-arms. In 1834 he founded, near New Haven, Conn., the pioneer factory for the manufacture of domestic hardware. In 1857 he invented the widely-known stone- and ore-crusher called the Blake crusher, which introduced a new era in road-making and mining industries, and is used throughout the world.

Blake, Francis, American inventor: b. Needham, Mass., 25 Dec. 1850. He served for 13 years on the United States Coast Survey, part of the time engaged in field work and its reduction to determine differences of longitude between the observatories at Greenwich, Paris, Cambridge, and Washington. Having devoted himself to the study of experimental physics, in 1878 he invented the famous Blake transmitter, which is the telephonic transmitter now most widely used throughout the world. He has also patented other electrical devices.

Blake, John Laurie, American clergyman and author: b. Northwood, N. H., 21 Dec. 1788; d. Orange, N. J., 6 July 1867. He was educated at Phillips Exeter Academy and at Brown University. He first entered the Congregational ministry, but in a short time became an Episcopalian and was ordained in that Church. He settled in Pawtucket, and later in Hopkinton, N. H., and in 1822 removed to Boston. He continued to teach in this school till 1830, then devoted himself to literary work. While a teacher he published several text-books, prepared for his own classes, and was editor of the 'Gospel Advocate.' His greatest work, a 'Biographical Dictionary,' was first published in 1835.

Blake, Mrs. Lillie (Devereux) Umstead, American advocate of woman's rights and novelist: b. Raleigh, N. C., 1835. Her first husband, Frank G. Quay Umstead, died in 1859; she married Grenfill Blake in 1866, who died in 1896. She has written and spoken much on woman suffrage and the like, and her novels bear on this theme. She has written 'Southwold' (1859); 'Rockford' (1863); 'Fettered for Life' (new ed. 1885); 'Woman's Place To-Day' (1883), a reply to Dr. Morgan Dix's 'Lenten Lectures on Women,' which attracted attention; etc. In 1900 she was president of the Civic and Equality Union.

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Blake, Mary Elizabeth McGrath, American poet and writer: b. Dungarven, Ireland, 1 Sept. 1840. In verse she has written 'Poems' (1882); 'Youth in Twelve Centuries' (1886); etc. Of her travels may be named 'On the Wing' (1883); 'A Summer Holiday.'

Blake, Robert, British admiral: b. Bridgewater, Somerset, August 1599; d. 17 Aug. 1657. After attending the grammar school of his native place he was sent to Wadham college, Oxford, where he took the degree of B.A. in 1617. On his return to Bridgewater he lived quietly on the fortune left him by his father, and was led to embrace the principles of the Puritans, by whose interest he was elected member for Bridgewater in the Parliament of 1640. This being soon dissolved, he lost his election for the next, and immediately sought to advance the cause in a military capacity in the war which then broke out between the king and the Parliament. He soon distinguished himself by his activity. In 1649 he was sent to command the fleet in conjunction with Cols. Deane and Popham, and thus commenced the naval career which has given him so distinguished a place in British history. He immediately sailed to Kinsale in quest of Prince Rupert, whom he attempted to block up in that port. The prince escaped to Lisbon, where Blake followed him; and, being refused permission to attack him in the Tagus by the king of Portugal, he took several rich prizes from the Portuguese (against whom the Parliament declared war), and followed Rupert to Malaga, where, without asking permission of Spain, he attacked him and nearly destroyed the whole of his fleet. On his return to England he was made warden of the Cinque Ports, and soon after reduced the islands of Scilly and Guernsey. In 1652 he was made sole admiral, and on the 19th of May was attacked in the Downs by Van Tromp with a fleet of 45 sail, the force of Blake amounting only to 23. He fought so bravely, however, that Van Tromp was obliged to retreat. He then continued his cruise, took a number of Dutch merchantmen, and after several partial actions drove the enemy into their harbor and returned to the Downs. On 29 May he was again attacked by Van Tromp, whose fleet was now increased to 80 sail. Blake engaged this vast force with a very inferior number and an unfavorable wind; but, after every possible exertion, was obliged to retreat into the Thames, on which Van Tromp was so much elated that he sailed through the Channel with a broom at his masthead, to signify that he had swept the sea of British ships. In the February following, Blake, having with great diligence repaired his fleet, put to sea with 60 sail, and soon after met the Dutch admiral, who had 70 sail and 300 merchantmen under convoy. During three days a furious running fight up the Channel was maintained with obstinate valor on both sides, the result of which was the loss of 11 men-of-war and 30 merchant ships by the Dutch, while that of the English was only one man-of-war. It was in April of this year that Cromwell assumed the sovereignty, on which occasion Blake and his brother admirals issued a declaration that, notwithstanding this change, they resolved to persist in faithfully performing their duty to the nation. "It is not for us," said Blake to his officers, "to mind state affairs, but to keep the foreigners from fooling us." On 3

June he again engaged Van Tromp with dubious success; but, renewing the action the next day, he forced the Dutch to retire with a considerable loss in ships and men. On his return he was received by Cromwell with great respect, and returned member in the new Parliament for Bridgewater. Aware of his affection for a republican government, the protector was not displeased at having occasion to send him, with a strong fleet, to enforce a due respect to the British flag in the Mediterranean. He sailed first to Algiers, which submitted, and then demolished the castles of Goletta and Porto Ferino, at Tunis, because the dey refused to deliver up the British captives. A squadron of his ships also blocked up Cadiz and intercepted a Spanish plate fleet. Being now very sick, he resolved to do one more service to his country before his death, and sailed with 24 ships to Santa Cruz, in Teneriffe, and, notwithstanding the strength of the place, burned the ships of another Spanish plate fleet which had taken shelter there, and by a fortunate change of wind came out without loss. His brother having failed in some part of duty during this service, he immediately removed him from his command. Finding his disorder making rapid progress he then sailed for England, and expired while the fleet was entering Plymouth Sound. His body was honored with a magnificent public funeral, and interred in Westminster Abbey, whence it was, with pitiful spite, removed at the Restoration and buried in St. Margaret's churchyard. So disinterested was he that, after all his rich captures and high posts, he scarcely left behind him \$2,500 of acquired property, freely sharing all with his friends and seamen, into whom he infused that intrepidity and spirit of enterprise by which the British navy has been ever since so highly distinguished.

Blake, William, English poet, painter, and engraver: b. London, 28 Nov. 1757; d. 12 Aug. 1857. At the age of 10 he was sent to a drawing-school, and four years later he was apprenticed for seven years to the engraver James Basire, for whom he drew from the monuments in the older London churches and Westminster Abbey. In 1778 he studied in the Royal Academy, and about this time he began to engrave for the booksellers, among his chief productions being plates after Stothard for the 'Novelists' Magazine.' To the first exhibition of the Royal Academy he sent a drawing entitled 'The Death of Earl Godwin.' He married in 1782, and for the three years 1784-7 carried on a printseller's shop in partnership with another engraver. From his earliest years Blake was a mystic. He believed that all things exist in the human imagination alone, and had a wonderful power of imaginative vision which enabled him to see angels in trees and in fields, great men of past times, etc. His 'Songs of Innocence,' verse and designs (1789), and the companion 'Songs of Experience' (1794), were reproduced by himself and his wife by a process which he believed to have been revealed to him in a dream by a dead brother. Between 1793 and 1800 he produced a large number of designs, among them 537 illustrations for Young's 'Night Thoughts.' In 1800 he became acquainted, through Flaxman, with the poet William Hayley, who gave him artistic commissions, and for three years he lived in his neighborhood at Felp-ham. He next produced the designs to Blair's

'Grave' (engraved by Schiavonetti), which stand in the forefront of his artistic work. In 1808 he sent to the Royal Academy the pictures 'Christ in the Sepulchre Guarded by Angels,' and 'Jacob's Dream,' the last pictures he exhibited there. From 1813 till his death he had a staunch friend and patron in the painter John Linnell. It was about this time that he executed the series of pencil drawings known as 'Spiritual Portraits.' The highly prized woodcuts to Thornton's 'Virgil' were executed in 1820, and in 1825 he produced for Linnell his wonderful 'Inventions to the Book of Job,' which, containing 22 engravings, 21 original designs in colors, with the original colored drawings by the artist (the property of the Earl of Crewe), sold in London, in 1903, for \$28,000. He also executed a series of engravings and designs from the 'Divina Commedia.' At the sale just mentioned 12 drawings in colors for 'L'Allegro' and 'Il Penseroso' brought \$9,800, and the original colored issue of 'America, a Prophecy,' sold for \$1,475. Among Blake's other writings are: 'Poetical Sketches' (1783); 'Gates of Paradise' (1793); 'Prophetic Books,' sadly incoherent, but with splendid designs (1793-1804). The only complete edition of his works is that of E. J. Ellis and W. B. Yates (3 vols. 1893). Consult Gilchrist's 'Life' (1863), and 'Works' by Swinburne (1868), and Story (1893).

Blake, William Phipps, American mineralogist: b. New York, 1 June 1826. Graduating at the Sheffield Scientific School in 1852, he joined the United States Pacific Railroad exploring expedition (1853) as mineralogist and geologist. In 1861 he became mining engineer for the Japanese government, and with R. Pumpelly organized the first school of science in Japan. As an expert in his specialty he was connected in important capacities with the Paris Exposition of 1867, the Vienna Exposition (1873), United States Centennial Exhibition (1876), Paris Universal Exposition (1878), and drafted the system of classification of United States ores and minerals at the Columbian Exposition (1893). He has conducted important explorations in Alaska, California, and Nevada, and the chief mining districts of the United States, frequently publishing his results in valuable reports and scientific papers. Publications: 'Silver Ores and Silver Mines' (1861); 'California Minerals' (1863); 'Production of the Precious Metals' (1867); 'Iron and Steel' (1873); 'Ceramic Art and Glass' (1878); 'History of the Town of Hamden, Conn.'; 'Life of Captain Jonathan Mix.'

Blake, William Rufus, American actor: b. Halifax, N. S., 1805; d. Boston, 22 April 1863. His first appearance on the American stage was at the old Chatham Theatre, New York, under the management of Mr. Barrere, in 1824, as Frederic in 'The Poor Gentleman,' and in Elliston's favorite character in 'The Three Singles.' His success was great. Jesse Rural, in 'Old Heads and Young Hearts,' was one of his best parts. Mr. Blake was a fluent and effective speaker. He was stage manager of the Tremont Theatre, Boston, joint manager of the Walnut Street Theatre, Philadelphia, and stage manager of the Broadway Theatre, New York.

Blakeley, Johnston, American naval officer: b. near Seaford, County Down, Ireland,

October 1781; lost at sea, 1814. His father emigrated to the United States in 1783, and eventually made his home in Wilmington, N. C. Johnston graduated at the University of North Carolina in 1800, and on 5 February of that year entered the navy as midshipman, and rose to the rank of captain. On 1 May 1814 he left Portsmouth, N. H., in command of the new sloop-of-war Wasp, and very shortly appeared in the English Channel, spreading terror among the merchant ships and seaport towns. On 28 June he fought and defeated the British sloop Reindeer, for which exploit Congress voted him a gold medal. On 1 September he destroyed the Avon and on the 21st, near the Azores, took the Atlanta, which he sent home to Savannah. On 9 October the Wasp was spoken by the Swedish bark Adonis; and that was the last ever heard of the vessel and of those on board of her. It seems probable that, being heavily armed and sparred, the vessel foundered in a gale.

Blakelock, Ralph Albert, artist: b. New York, 15 Oct. 1847. He graduated at the College of the City of New York in 1867, and it was intended that he should follow his father's profession of medicine, but he developed a strong taste for music and the arts, and without a master taught himself painting. He has painted landscapes, moonlight scenes, and Indian figures; one of the last-named represents the Ta-vo-kok-i, or circle-dance of the Kavavite Indians. His work is very striking on account of its harmonious color-schemes. His studio is in New York.

Blakesley, Joseph Williams, English clergyman: b. London, 6 March 1808; d. Lincoln, 18 April 1885. He graduated at Trinity College, Cambridge, in 1831; was Fellow there 1831-45, and select preacher 1840-3; became a member of the New Testament Committee on Bible Revision in 1870; became dean of Lincoln in 1872. His publications include 'Life of Aristotle' (1839); 'Conciones Academicæ' (1843); and an edition of 'Herodotus' (2 vols., 1852-4).

Blakey, Robert, English writer: b. Morpeth, Northumberland, 18 May 1795; d. Belfast, 26 Oct. 1878. He bought the Newcastle *Liberator* in 1838, and got himself into trouble with the government on account of certain alleged seditious articles which he published. In 1848 he became professor of logic and metaphysics at Queen's College, Belfast. Among his works are 'Treatise on the Divine and Human Wills'; 'History of Moral Science'; 'Historical Sketch of Logic'; 'Temporal Benefits of Christianity'; and 'The Angler's Song Book.'

Blanc, blôn, Anthony, American clergyman: b. Sury, France, 11 Oct. 1792; d. New Orleans, 20 June 1860. He was ordained to the Roman Catholic priesthood in 1816; went to Annapolis, Md., in 1817; was appointed bishop of New Orleans in 1835; and became archbishop there in 1850.

Blanc, Jean-Joseph-Louis, zhôn-zhō-sěf-loo-ē, French historian, publicist, and socialist: b. Madrid, 29 Oct. 1811; d. 6 Dec. 1882. He studied with great success in the college at Rodez, and completed his education at Paris. He was for a short time an attorney's clerk, afterward a teacher of mathematics and a private tutor. Subsequently at Paris he devoted him-

self to the career of journalism, fighting stoutly in the ranks of the militant democracy. In 1839 he founded the *Revue du Progrès*, in which first appeared his great work on socialism, 'De l'Organisation du Travail' (separately published in 1840). In this work he condemns individual and competitive rivalry in labor; society should not be subjected to a perpetual combat, but should form a harmonious whole, in which each member should contribute according to his abilities and be recompensed according to his needs. In 1841-4 appeared his 'Histoire de Dix Ans' (1830-40), in which he vigorously exposed the trickery and jobbery of the government of Louis Philippe, and which greatly contributed to bring about its downfall. On the outbreak of the revolution of 1848 Blanc was elected a member of the provisional government, and appointed president of the commission for the discussion of the question of labor. He has been unjustly charged with creating and organizing the disastrous scheme of national workshops, a scheme which he strenuously opposed. After the closing of these workshops, and the June insurrection of 1848, he was prosecuted for conspiracy, but escaped to England, where he took up a lengthened residence. During this period he wrote the bulk of his famous 'Histoire de la Révolution Française' (12 vols. 1847-62). His other works are: 'Lettres sur l'Angleterre' (1865-7); 'Histoire de la Révolution de 1848' (1870); 'Questions d'Aujourd'hui et de Demain' (1873-4); etc. On the downfall of the second empire (1870) Blanc returned to Paris and became a member of the National Assembly in 1880.

Blanc, Ludwig Gottfried, lood'víg got'-fréd, German philologist. b. Berlin, 19 Sept. 1781; d. Halle, 18 April 1866. He was educated at the French Theological Seminary in Berlin and ordained as pastor at Halle. In 1811 he was accused of taking part in a conspiracy against the king of Westphalia, and was imprisoned at Magdeburg, and later at Kassel, until released in 1813 by a Russian skirmishing corps. He was chaplain in the Prussian army in the war of 1814-15; from 1822 was professor of the Romance languages at the University of Halle; and in 1860 was appointed preacher at the cathedral in that city. He was an authority on the Romance languages and especially on the works of Dante. In connection with his study of Dante he wrote a 'Dante Vocabulary' (in French); 'Attempt at a Philological Explanation of Several Disputed Points in the "Divine Comedy"'; and translated the 'Divine Comedy' into German. He has written also 'Grammar of the Italian Language'; and a 'Handbook of the Most Remarkable Facts of Nature and the History of the Earth and Its Inhabitants.'

Blanc, Marie Thérèse, mǎ-rē tā-rāz (THÉRÈSE BENTZON), French novelist and littérateur: b. Seine-Port, 21 Sept. 1840. She has been for many years on the editorial staff of the 'Revue des Deux Mondes,' to which she has contributed notable translations and reviews of many American, English, and German authors. Her literary essays on these contemporaneous writers were collected in 'Foreign Literature and Customs' (1882), and 'Recent American Novelists' (1885). Her first work to attract attention was 'A Divorce' (1871), published in

the 'Journal des Débats.' Two other novels, 'A Remorse' (1879), and 'Tony' (1889), were crowned by the French Academy. Other stories are 'Georgette' and 'Jacqueline' (1893). The fruit of her first visit to the United States was 'Condition of Woman in the United States' (1895).

Blanc, Paul Joseph, pōl zhō-zef, French genre painter. He studied under Bin and Cabel. He won the Grand Prix de Rome in 1867; the first-class medal of the Paris Salon in 1872; the decoration of the Legion of Honor in 1878; and the first-class medal in the Paris Exposition of 1889. One of his best-known works is a decorative composition depicting the consecration, baptism, and triumph of Clovis.

Blanc, Mont. See MONT BLANC.

Blanchard, blān-shārd, Edward Laman, English dramatist and novelist: b. London, 1820; d. 1889. His novels, 'Temple Bar' and 'A Man Without a Destiny,' evinced no special talent for story-telling; on the other hand he composed for Drury Lane Theatre about 100 Christmas pantomimes in the vein of grotesque burlesque, among them 'Sinbad the Sailor,' which were received with unbounded popular favor.

Blanchard, Emile, ā-mēl blōn-shār, French naturalist: b. Paris, 6 March 1819. He is especially renowned as an entomologist, and is the author of many scientific works, including 'Researches into the Organization of Worms' (1837); 'Natural History of Orthopterous and Neuropterous Insects' (1837-40); 'History of Insects, etc.' (1843-5).

Blanchard, François, frān-swā, French aéronaut: b. 1753; d. 1809. He displayed great ingenuity by the invention of a hydraulic machine in the 19th year of his age, and afterward in the construction of a flying ship, which, by means of a counterpoise of six pounds, was raised to more than 20 feet from the ground. He eagerly availed himself of the discoveries of the brothers Montgolfier, and the improvements of the same by Prof. Charles and M. Robert in Paris. After having made his first aérostatic voyage, 4 March 1784, he crossed the Channel from Dover to Calais, 1785, with Dr. Jeffries, a gentleman of Boston. For this exploit he was rewarded by the king of France with a present of \$2,400 and a pension of \$240. In the same year, at London, he first made use of a parachute invented by him, or, according to others, by Etienne Montgolfier. After having performed many aérostatic voyages in foreign countries also, he was accused of propagating revolutionary principles, and imprisoned (1793) in the fortress of Kufstein, in the Tyrol. Having obtained his liberty, he made his 46th ascent in the city of New York in 1796. In 1798 he ascended with 16 persons in a large balloon at Rouen, and descended at a place 15 miles distant. In 1807 his aérostatic voyages amounted to more than 66. His wife continued to make aérial voyages. In 1811 she ascended in Rome, and after going a distance of 60 miles she rose again to proceed to Naples. In June 1819 having ascended from Tivoli, in Paris, her balloon took fire at a considerable height, from some fire-works which she carried with her. The car fell in the Rue de Provence, and the aéronaut was dashed to pieces.

BLANCHARD — BLANCHING

Blanchard, Jacques, zhäk, French painter: b. Paris, 1600; d. 1638. He received the first lessons of his art from Bellori, his maternal uncle, studied some time at Lyon, and in 1624 repaired to Rome. After two years he visited Venice, studied the works of Titian and the other great colorists of his school, and executed several paintings which gave him a name. After his return to Paris he executed a great number of works, which procured him the surname of "the French Titian." His best piece, a 'Descent of the Holy Spirit,' is in the cathedral at Nôtre Dame.

Blanchard, Jonathan, American educator: b. Rockingham, Vt., 19 Jan. 1811; d. Wheaton, Ill., 14 May 1892. He graduated at Lane Theological Seminary in 1832 and was ordained a Presbyterian minister in 1838. He was American vice-president of the World's Anti-Slavery Convention in London in 1843; and in 1846 became president of Knox College at Galesburg, Ill. He was president of Wheaton College, Ill., 1880-2; and, on resigning, was chosen president-emeritus, and subsequently gave most of his time to editing 'The Christian Cynosure.'

Blanchard, Thomas, American inventor: b. Sutton, Worcester County, Mass., 24 June 1788; d. 16 April 1864. He joined his brother in the manufacture of tacks by hand, and at the age of 18 commenced his invention of a tack-machine, which in six years he brought to such perfection that by placing in the hopper the iron to be worked, and applying the motive power, 500 tacks were made per minute with better finished heads and points than had ever been made by hand. He sold the patent for \$5,000. About this time various attempts were made in the United States armories at Springfield and Harper's Ferry, to turn musket-barrels with a uniform external finish. Blanchard undertook the construction of a lathe to turn the whole of the barrel from end to end, by the combination of one single self-directing operation. About three inches of the barrel at the breech was partly cylindrical and partly with flat sides; these were all cut by the same machine, ingeniously changing to a vibrating motion as it approached the breech. The superintendent of the Springfield armory contracted with Mr. Blanchard for one of his machines. While it was in operation one of the workmen remarked that his own work of grinding the barrels was done away with. Another, employed on the wooden stocks, which were then all made by hand, said that Blanchard could not spoil his job, as he could not make a machine to turn a gunstock. Blanchard answered that he was not sure, but he would think about it, and as he was driving home the idea of his lathe for turning irregular forms suddenly struck him. The principle of this machine is, that forms are turned by a pattern the exact shape of the object to be produced, which in every part of it is successively brought in contact with a small friction-wheel; this wheel precisely regulates the motion of chisels arranged upon a cutting wheel acting upon the rough block, so that as the friction-wheel successively traverses every portion of the rotating pattern, the cutting wheel pares off the superabundant wood from end to end of the block, leaving a precise resemblance of the model. This remarkable machine, with modifications and improvements, is in use in the

national armories as well as in England, and in various forms is applied to many operations in making musket-stocks, such as cutting in the cavity for the lock, barrel, ramrod, butt-plates, and mountings, comprising, together with the turning of the stock and barrel, no less than 13 different machines. Beside gunstocks, it is also applied to a great variety of objects, such as busts, shoe lasts, handles, spokes, etc. Mr. Blanchard was also interested at an early day in the construction of railroads and locomotives, and in boats contrived to ascend rapid rivers. He also invented a machine for cutting and folding envelopes, a steam wagon, and a process for bending heavy timbers.

Blanche of Bourbon, Castilian queen: b. 1338. She was the daughter of Peter, Duke of Bourbon, and in 1353 married Peter, king of Castile, surnamed the Cruel. Don Frederick, Peter's natural brother, had been deputed to meet her at Narbonne and bring her into Spain, and she is said to have so far forgotten herself as to conceive a violent passion for him. Rumors to this effect had reached the king's ears, and though he celebrated the marriage he soon showed that he had placed his affections elsewhere. He shortly after declared the marriage null, imprisoned the queen in the castle of Medina Sidonia, and is said to have gotten rid of her by poison.

Blanche of Castile, French queen: b. 1187; d. Milan, November 1252. She was the daughter of Alphonso IX., married Louis VIII. of France and became the mother of Louis IX. ("St. Louis"). On the death of her husband she anticipated the formal appointment of a regency by procuring the immediate coronation of her son, and during his minority held the reins of government in his name with distinguished ability and success. In 1244, when St. Louis took his departure for the Holy Land she again became regent and gave new proofs of her talents and virtues. Her days are said to have been shortened by the long absence of her son, and a prevailing rumor that he had resolved to remain permanently in Palestine.

Blanche, August Théodor, ow'goost tã'ô-dôr blànsh, Swedish dramatist and novelist: b. Stockholm, 17 Sept. 1811; d. Stockholm, 30 Nov. 1868. His comedies and farces,—more particularly 'Jenny, or the Steamboat Trip'; 'The Doctor'; 'The Rich Uncle'; and 'The Foundling'—have made all Sweden laugh; while his realistic fictions,—among them 'The Spectre'; 'Tales of a Cabman,' and 'Sons of North and South,'—are eagerly read.

Blan'chet, Joseph Goderick, Canadian statesman: b. Saint Pierre, 1829. He studied medicine, graduating from the College of Saint Anne; but has been especially active in public life; he has been mayor of Lévis, speaker of the Provincial legislature of Quebec for seven years, and member of the Canadian Assembly, from which he resigned on account of the law on dual representation.

Blanching, the process which prevents or checks the formation of chlorophyll and other substances in plants by excluding light. It alters the flavor as well as lightens the color of celery, sea-kale, asparagus, etc., and is generally accomplished by covering the plants with earth, boards, straw, paper, etc., or, in a small way, by inverted flower-pots, kegs, barrels, etc.

BLANCO — BLAND

Blanco, Antonio Guzman, ăn-tō'nyō gooz'-mān blān'kō, Venezuelan soldier: b. Caracas, 29 Feb. 1828; d. 29 July 1899. He became prominent in the Federalist revolts, 1859-63, and, when his party triumphed, was made first vice-president in 1863 under Falcon, who was deposed in the revolution of 1868. Blanco led a successful counter-revolution in 1870, became president, and retained the office till 1882. In 1893 he was appointed minister to France, where he resided till his death.

Blanco, Jose Felix, hō'sa fā-lēks, Venezuelan historian: b. Mariana de Caracas, 24 Sept. 1782; d. Caracas, 8 Jan. 1872. At different times he acted in the capacity of priest, soldier, and statesman. He was one of the leaders in the revolution at Caracas, 19 April 1810, and was the first editor of the great historical work, 'Documentos para la historia de la vida publica del Libertador,' etc.

Blanco, Pedro, pā'drō, Bolivian statesman: b. Cochabamba, 19 Oct. 1795; d. Sucre, January 1829. He joined the Spanish army in 1812, but soon deserted to the patriots, and served with them till the end of the revolution. In 1828 he became a general, and in the same year, when Sucre fell, was made president of Bolivia, but was superseded in the revolution of 31 Dec. 1828. He was shot in Sucre.

Blanco, Ramon y Arenas, rā'mōn ē a-rā-nas, MARQUIS DE PENA PLATA, Spanish soldier: b. San Sebastian, Spain, 1833. He began his military career in 1855 as lieutenant; was promoted captain in 1858, and won the rank of lieutenant-colonel in the war with San Domingo. When the Spaniards were driven from the island Blanco went to the Philippines as governor of Mindanao. When he returned to Spain he was assigned to the Army of the North, and in the war with the Carlists made a brilliant record. He successfully stormed Pena Plata, for which achievement he was created a marquis with that title. He succeeded Gen. Weyler as captain-general in Cuba. His career has been marked by deeds of blood and violence. When in command at the Philippines he ordered 169 prisoners to be thrown into a dungeon, where they were left for two days. When the guard opened the door they were all dead from asphyxiation. In the second Cuban insurrection 1,500 defenseless prisoners were slaughtered by his orders. At Cavité the Spanish captured several native leaders, and, by Blanco's instructions, after being tortured, the unhappy wretches were disemboweled and their bleeding bodies hung on the gates of the city. The Spanish government permitted him to resign his post in Cuba before the day set for the American occupation.

Blanco, Encalada, Manuel, mā-noo-el blān-ko-ēn-kā-lā'da, Spanish-American soldier: b. Buenos Ayres, 5 Sept. 1790; d. 5 Sept. 1875. He distinguished himself in the Chilean war of independence. He was chosen president of Chile in July 1826, but soon resigned and was made general of the army. He unsuccessfully invaded Peru in 1837, and was not allowed to retire till he had signed a treaty of peace. Chile annulled this treaty, and he was court-martialed, but freed. In 1847 he was intendant of Valparaiso, and in 1853-8 minister to France.

Blanco, blān'kō, Cape (literally, "white cape"), a name given to a great number of capes by the Spaniards, Portuguese, and Italians. It corresponds to the French *cap blanc*. The name is as common and as unphilosophical as that of White Hill, Black River, etc. The cape best known by this name is a headland on the west coast of Africa, in lat. 20° 47' N., and lon. 16° 58' W., the extremity of a rocky ridge which projects from the Sahara in a westerly direction, and then bending southward forms a commodious harbor called the Great Bay. Cape Blanco was first discovered by the Portuguese in 1441.

Bland, Edith Nesbit (E. NESBIT), English writer: b. London, 15 Aug. 1858. She was married to Hubert Bland, 1879. She has written several volumes of verse, as well as a series of popular children's books and several novels. Her published works include: 'Lays and Legends' (1886-92); 'Leaves of Life' (1888); 'A Pomander of Verse' (1895); 'Grim Tales' (1893); 'Something Wrong' (1893); 'The Marden Mystery' (1896); 'Songs of Love and Empire' (1897); 'The Secret of Kyriels' (1898); 'The Story of the Treasure Seekers' (1899); 'Pussy and Doggy Tales' (1899); 'The Book of Dragons' (1900); 'The Would-be Goods'; 'Nine Unlikely Tales'; 'Thirteen Ways Home' (1901); 'Five Children and It' (1902); 'The Red House' (1902); with Hubert Bland, 'The Prophet's Mantle' (1889); with Barron, 'The Butler in Bohemia' (1894).

Bland, Richard Parks, American legislator: b. near Hartford, Ky., 19 Aug. 1835; d. Lebanon, Mo., 15 June 1899. He received an academical education, and, between 1855 and 1865, practised law in Missouri, California, and Nevada, and was engaged for some time in mining. In 1865 he settled in Rolla, Mo., and practised there till he removed to Lebanon in the same State. He was a member of Congress in 1873-95 and from 1897 till his death. In 1896 he was a conspicuous candidate for the presidential nomination in the Democratic National Convention, but on the fourth ballot his name was withdrawn, and the vote of his State was cast for William J. Bryan. Mr. Bland was best known as the leader in the Lower House of Congress of the Free-Silver movement, and the author of the Bland Silver Bill. At the time of his death he was a member of the committees on coinage, weights and measures, and expenditures on public buildings.

Bland, Theodor, American military officer: b. Prince George County, Va., 1742; d. 1 June 1790; he studied medicine in the University of Edinburgh, and for a time practised in England. He returned home in 1764, wrote against Gov. Dunmore under the name of Cassius; and was active in his profession until the outbreak of the Revolutionary War, when he sided with the Colonists, and became captain of the first troop of Virginia cavalry. In 1777 he joined the main army as a lieutenant-colonel, and later became a colonel. He distinguished himself at the battle of Brandywine, and was placed in command of the prisoners taken at Saratoga, who were marched to Charlottesville, Va. In 1780-3 he was a member of the Continental Congress, and was a representative from Virginia to the First Federal Congress in 1789.

BLANK VERSE — BLANQUI

Blank Verse, verse without rhyme. This was the invariable form of the poetry of the ancients, but it is now peculiar to the Italian, English, and German languages. The poetry of the Anglo-Saxons and the earliest English poetry was not rhymed, yet it is not generally called blank verse, as their versification had a peculiarity of its own called alliteration. When rhyme, however, was once introduced into English verse, it was for a long time regarded as the exclusive form of versification, and the Earl of Surrey, who was beheaded by order of Henry VIII. in 1547, is said to have been the first to use blank verse in England, namely, in his translation of the second and fourth books of Virgil's *Æneid*. The most common form of blank verse in English poetry is the decasyllabic, such as that of Milton's *Paradise Lost* and the dramas of Shakespeare. From Shakespeare's time it has been the kind of verse almost universally used by dramatic writers. Dryden, indeed, after the Restoration, introduced rhyme into his tragedies, in imitation of the French rhymed plays; but after keeping the stage for a number of years, they became intolerable to the English ear, and the introduction of rhyme into the drama has never since been attempted in England. Shakespeare not uncommonly ends a scene with a few lines of rhyme, although the rest of the scene is in blank verse, and in the subordinate play interwoven with the action of Hamlet blank verse is used throughout. The first use of the term blank verse is said to be in Hamlet, ii. 2: "The lady shall say her mind freely, or the blank verse shall halt for't."

Blanket (that is "fine white" goods), a heavy bed or horse cover, of a fabric with a thick soft nap on both sides. Originally made entirely of wool, and still so in the finest grades, the bulk of medium and cheap blankets are now made with a cotton chain or warp and a wool filling, as cheaper, stiffer, and little less durable in good condition. In the finest grades of American blankets, the filling is Australian wool, the longest and softest fibre known; the warp of American wool. The cheapest ones have for filling the shorter combings of wool, shoddy, etc.; ordinary horse blankets the same or still coarser half-cleaned wool, and largely animal hair. Of late also an immense quantity of all-cotton blankets are made, the nap being cotton wool; these have competed less with wool blankets than with comfortables, whose sale for a time they cut in half. They are used for economy, where heavy blankets are not needed, and to replace cotton sheeting in cold rooms, for children, etc.

The most famous blankets in the world are those of the Mysore in India, so delicate that one 18 feet long can be rolled inside a hollow bamboo, and costing \$150. In the United States they are a specialty in southwestern Indian domestic manufacture, especially among the quite civilized Navajos, whose rough hand looms and stick shuttles turn out blankets weighing 20 pounds or more, and selling for \$1 and \$2 a pound, much prized by Alaskan and Klondike gold-seekers. But of civilized manufacture, the finest are from the Pacific slope, California, and Oregon, and from Minneapolis; some of these retail for \$25 per pair with a weight of less than 10 pounds. Maine, Ohio, and West Virginia also produce very fine goods. Below the above

fancy price, of which much is loading for short runs, prices range for all-wool blankets from \$20, the highest usually kept in stock, down to \$7.50, and for cotton-warp down to \$2, all-cotton, \$1.

Practically no blankets have been imported into this country since before the War. The early manufacture here was "a series of costly and futile experiments," except a few coarse ones for army or navy use, and for slaves on plantations, for which in 1831 a mill was started in Pendleton, S. C.; another to make "Indian" blankets was opened in Buffalo the same year. But the first effective attempt was under the sharp tariff of 1842, soon swept away by the moderate one of 1847. The severe one of 1857, however, which formed one of the southern counts for secession, taxed imported blankets so heavily that by 1861 importations had practically ceased. In 1860 the United States' total manufacture was 616,400 pairs, mainly in New England, Pennsylvania, and California. In 1880 this had increased to 4,400,000, gross value \$6,840,000, and the prices had dropped so much that the cheaper grades had gone out of use; the foreign commissioners at the Centennial of 1876 reported that for weight, thickness, softness, and perfection of surface, nothing in Europe compared with the American, and that the European cheaper grades could not be sold even to the Indians. But competition had so glutted the market that in 1878 a great auction was held in New York to clear them off, at heavy sacrifice. In 1890 the manner of report was changed to square yards,—20,793,644 of "house blankets," valued at \$7,153,900, and 5,507,074 of horse blankets, \$1,721,516. For some reason, probably the larger use of comfortables, the use of the all or part-wool article fell off heavily in the last decade—to 18,155,505 square yards, valued at \$5,200,959; though horse blankets increased to 7,315,304, valued at \$1,740,988 or about the same as before. The chief seats of manufacture were Pennsylvania for all-wool, and Massachusetts for cotton-warp, though Indiana, Minnesota, California, and several other States furnished large quantities.

The nap is formed in the finest grades, and till recently was so altogether, by pulling up the fibre with teazles; these have now been replaced in the cheaper makes with steel teeth or brushes on revolving cylinders, which, however, are too inflexible and liable to tear the goods to be trusted with expensive ones. The use of Jacquard patterns with two or three colors, in place of printed ones, is another change which has popularized blankets by increasing their beauty.

Blanqui, blăn-ke, Jérôme Adolphe, French economist: b. Nice, 1798; d. 1854. While studying medicine at Paris he made acquaintance with Jean Baptiste Say, and was induced to devote himself to the study of economics. He succeeded Say in the Conservatoire des Arts et Métiers as professor of industrial economy. Blanqui, who favored a free-trade policy, published, among other works, *Précis Élémentaire d'Économie Politique* and *Histoire de l'Économie Politique en Europe*.

Blanqui, Louis Auguste, French revolutionist: b. Nice, 7 Feb. 1805; d. 1 Jan. 1881. He made himself conspicuous chiefly by his passionate advocacy of the most extreme political opin-

BLANQUILLO — BLASPHEMY

ions, for which he suffered with the pride of a martyr. He was one of the foremost fighters in all the French revolutions of the 19th century. In 1830 he was decorated for his valor at the barricades. In 1848 he figured as the chief organizer of the popular movement under the provisional government. He took the lead also in the revolutionary *attentat* of 15 May, the aim of which was to overthrow the Constituent Assembly. At the head of an excited mob he demanded of the French representatives the resuscitation of the Polish nationality, while one of his friends pronounced the dissolution of the Assembly. For his share in these disturbances he was rewarded with a 10 years' imprisonment in Belleisle. In 1861 Blanqui was sentenced to another imprisonment of four years. After the downfall of the second empire in 1870, Blanqui resumed his revolutionary activity, and, in 1871, took a prominent part in forming the Commune. Being too unwell to endure transportation to New Caledonia, he was condemned to imprisonment for life, from which he was released in 1879. He spent nearly half of his life in prison.

Blanquillo, *blān-kēl'yō*, a fish of the Gulf of Mexico (*Caulolatilus chrysops*), related to the tile-fish. The name is also given in southern California to the yellow-tail (q.v.).

Blarney, Ireland, a village four miles northwest of the city of Cork, near the stream of same name, here crossed by a handsome bridge of three arches. It is a small but well-built place; and besides the parish church, contains a national school. Flax and cotton were formerly manufactured to some extent, but both of these branches have now decayed. Spinning and dyeing woolen yarn is, however, still carried on; and there is an extensive tweed manufactory employing a number of people. Blarney Castle stands on an isolated limestone rock at the junction of the Blarney and Comane. Erected in the 15th century, it was the scene of several interesting historical events; but derives its chief notoriety from a stone in its northeast angle, several feet from the top, bearing a Latin inscription, recording the date of the erection, and called the "Blarney Stone." To this stone tradition ascribes the faculty of communicating to all who kiss it that species of most persuasive fluency of speech commonly called "blarney." The "groves of Blarney" are extensive and interesting, and beneath the castle there are also some curious natural caves.

Bläser *blē'zēr*, **Gustav**, German sculptor: b. Düsseldorf, 9 May 1813; d. Cannstatt, 20 April 1874. He was associated 11 years with Rauch and for that time shared in all his work. In 1845 he went to Rome, but returned to Berlin when appointed to design one of the groups for the "Schlossbrücke." His group, 'Minerva Leading a Young Warrior to Battle,' is thought to be the best of the series. Among his other works are a statue of St. Matthew in the church at Helsingfors; the 'Prophet Daniel'; Barussia in the new museum at Berlin; the statues of Jeremiah, Daniel, and Charlemagne for the church at Potsdam; the equestrian statue of Frederick William III. at Cologne; 'Hospitality'; and many busts, including one of Lincoln and one of Washington.

Blashfield, **Edwin Howland**, American artist: b. New York, 15 Dec. 1848; studied in Paris under Léon Bonnat; and began exhibiting

in the Paris Salon in 1874. He returned to the United States in 1881, and has since distinguished himself by the execution of large decorative works. Among his noteworthy productions in this line are one of the domes of the Manufacturers' building in the World's Columbian Exposition, the great central dome of the Library of Congress, and the new apartment of the appellate court in New York; besides ceiling and panel work in the residences of C. P. Huntington, W. K. Vanderbilt, and George W. C. Drexel, and in the Astoria ballroom and several clubhouses in New York.

Bla'sius, *St.*, or **St. Blaise**, Bishop of Sebaste, in Armenia, is said to have suffered martyrdom about 316, by order of Agricola, governor of Cappadocia and Little Armenia. He holds a place both in the Latin and Greek calendars, his day being 3 February. He is the patron saint of wool-combers, his flesh having been torn by iron combs. He is especially invoked in diseases of children and animals, and ailments connected with the throat are more particularly in his province.

Blasphemy, is somewhat variously defined. According to the most general definition, it means the denying of the existence of God; assigning to him false attributes, or denying his true attributes; speaking irreverently of the mysteries of religion; and formerly, in Roman Catholic countries, it also included the speaking contemptuously or disrespectfully of the Holy Virgin or the saints. Public blasphemy has been considered by the Catholic Church as an unpardonable sin, and it was formerly punished with death by the municipal laws. The 77th novel of Justinian assigned this punishment to it; and the capitularies inflicted the same punishment upon such as, knowing of an act of blasphemy, did not denounce the offender. The former laws of France punished this crime with fine, corporal punishment, the gallows, and death, according to the degree and aggravation of the offense. The records of the parliaments supply numerous instances of condemnation for this crime, and many of punishment by death; others of branding and mutilation. A man was for this offense condemned to be hanged, and to have his tongue afterward cut out, and the sentence was executed at Orleans as late as 1748. But it is remarked by a writer in the French 'Encyclopédie Moderne,' that we should form an erroneous opinion from the present state of society of the effect of this offense, and the disorders it might introduce in former times; for religion was once so intimately blended with the government and laws, that to treat the received articles of faith or religious ceremonies with disrespect was in effect to attack civil institutions.

By the common law of England, as stated by Blackstone, blasphemy consists in denying the being and providence of God, contumelious reproaches of Jesus Christ, profane scoffing at Holy Scripture, etc., and is punishable by fine and imprisonment, or corporal punishment; the offense is also statutory, the statute 9 and 10 William III. cap. xxxii., declaring that if any one shall deny any of the persons of the Trinity to be God, or assert that there are more gods than one, or deny the truth of Christianity or of the Scriptures, he shall be incapable of holding any office; and for a second offense be

BLAST FURNACE

disabled from suing any action, or being an executer, and suffer three years' imprisonment.

By the law of Scotland, as it stood under acts of 1661 and 1695, the punishment of blasphemy was death. Blasphemy consisted of railing at or cursing God, or of obstinately persisting in denying the existence of the Supreme Being, or any of the persons of the Trinity.

The early legislation of the American colonies followed that of the mother country, and in some of them the crime of blasphemy was punished with death; but the penalty was mitigated before the establishment of independence, and imprisonment, whipping, setting on the pillory, having the tongue bored with a red-hot iron, etc., were substituted. Several penalties against blasphemy are to be found in the laws of some of the New England States, according to which it is provided that, if any person shall blaspheme, by denying, cursing, or contumeliously reproaching God, his creation, government, or final judging of the world, or by cursing or reproaching Jesus Christ or the Holy Ghost, or contumeliously reproaching the Word of God, consisting of the commonly received books of the Old and New Testament, he is liable to imprisonment for a term not exceeding five years. But the most direct and public violations of these laws are passed over without punishment or prosecution, due probably to the provisions of the National and State Constitutions, guaranteeing religious liberty, and the freedom of speech. In many States, the offense of blasphemy, not being a subject of special statutory provision, is only punishable either as an offense at common law, or a violation of the statute laws against profane swearing.

Blast Furnace, a modern mechanical appliance, or structure built of refractory material in which metallic ores are smelted in contact with fuel and flux, the combustion of the fuel being accelerated by air under pressure. The materials are fed in at the top of the furnace, and after the ores are reduced, the metal, or in some cases the matte, and the resulting slag are tapped in a molten state at or near the bottom; as a rule, the slags, being of less specific gravity than the metal, float upon it. The sizes of blast furnaces vary from a few feet to over 100 feet in height, a horizontal section through the structure showing either circular or rectangular interiors, the circular form being adopted for the larger sizes, while those of smaller height are often made rectangular to permit of introducing a number of tuyeres with air nozzles into a narrow hearth.

A vertical section of a modern American blast furnace shows at the lower part, the hearth or crucible of the shape desired, into which the air is admitted under pressure through tuyeres. On this hearth is superposed an inverted frustum of a cone forming the boshes, and above these the shaft of the furnace ascends in the form of a right cone. The shafts are inclosed by shells of sheet steel or by crinolines formed of bands and beams, and carried on columns. The boshes are usually secured by bands and the crucibles by sheet and metal jackets. The materials are charged into the shaft so that layers of fuel alternate with layers of ore and flux, the taper of the shaft being sufficient to permit of expansion as the materials are heated, and facilitate their delivery to the hopper formed by the boshes,

where reduction of the ores takes place. The reduced ore, meeting the burning fuel near the tuyeres, is melted, and the liquid slag and metal drop into the hearth or crucible (the cinder or slag floating on the liquid metal), from which they are tapped out from time to time. By heating the blast before it enters the tuyeres combustion is accelerated, and the furnaces produce increased quantities of metal with reduced fuel consumption per unit of product.

The large blast furnaces smelt ores of iron or manganese, or of iron and manganese, and are from 40 to 106 feet in height, a cross section at the top of the boshes showing a circle from 10 feet to 23 feet in diameter. The blast is heated to 1,000°, and sometimes to 1,200°, or 1,400° F., and is forced into the crucibles or hearth through from 6 to 20 tuyeres, at pressures from 5 to 15, and, at times, exceeding 20 pounds per square inch. The blast furnaces smelting silver or copper ores seldom exceed 30 feet in height, the horizontal section being rectangular, and the blast pressure but a fraction of a pound. A modern blast furnace will produce from 300 to 600 tons of pig iron daily, requiring from 1,000 to 2,000 tons of ore, fuel and flux to be fed into it. The cost for construction and equipment of one of these modern furnaces, with its necessary railroad tracks, storage room and bins for receiving the raw material, the mechanism for elevating it to the top of the stack, with sufficient blowing engines, boilers, hot blast stoves, etc., ranges from \$400,000 to \$800,000.

As a rule, blast furnaces smelting other ores than those of iron have the top of the furnace stack open, while, in those producing iron, the top is usually sealed by a bell closing against a hopper, to distribute the stock in the wide throat of the furnace and to control the gases which are the result of the smelting operation, so as to employ the calorific value of these gases for heating the blast or for generating steam in boilers to operate machinery. The practicability of using these gases in engines, where the gas, in exploding, gives impetus to a piston, has also been demonstrated. The blast is heated in hot blast stoves, generally cylinders from 14 to 25 feet in diameter and from 50 to 115 feet high, filled with checker work of fire brick. These stoves are placed in series; the gas being admitted to and burned in a stove raises the temperature of the masonry, after which the gas is shut off and the blast forced through the highly heated checkers. By alternating a series of stoves on gas or blast, at intervals of one or two hours, a nearly uniform temperature is maintained.

The blast, after passing through the hot blast stoves, is conveyed in iron or steel conduits, lined with fire brick, to tuyeres, set in the walls of the crucible. These tuyeres are formed of an inner and outer shell with closed ends, water circulating between the two shells. The tuyeres are mostly made of bronze or copper and are set in larger tuyere blocks (also water cooled) of iron or bronze. Nozzles connect the lined air conduits to the tuyeres. The cooling water required by a modern blast furnace amounts to millions of gallons daily. A large furnace requires a boiler equipment of from 3,000 to 3,500 horse power for its blowing, pumping and elevating machinery.



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MODERN BLAST FURNACE, SHOWING AUTOMATIC HOISTING AND CHARGING EQUIPMENT.

BLASTING — BLAUBOK

Blast furnaces are numerous in Great Britain, Germany, France, Belgium, Spain, Russia, Austria-Hungary, Sweden, and they also exist in Canada, Mexico, Italy, China, India and Japan. Data as to the number of these is not at hand, but the following statement of the pig iron production of various countries gives an approximate idea:

Country.	Production in 1901. Tons.
United States	16,132,408
Great Britain	7,886,019
Germany and Luxemburg	7,835,204
France	2,567,388
Russian Empire	2,221,710
Austria-Hungary	1,427,240
Belgium	765,420
Sweden	528,375
Spain	295,840
Canada	218,896
Japan	57,673
Italy	8,333

It is impossible to give the total number of blast furnaces in the United States, for the reason that the number of those used for producing copper, silver, etc., are not collated, but lists of the furnaces employed in reducing iron ores are carefully reported by the American Iron and Steel Association. There were, in 1901, in the United States, a total of 411 blast furnaces, whose aggregate reported capacity amounted to 19,000,000 long tons of pig iron, but as all of these furnaces are not active at one time, it is more equitable to consider the practical production as between that reported and the greatest annual output, which, in 1901, amounted to 16,132,408 long tons.

Blasting, the technical term for splitting and breaking up any object by means of gunpowder or some of the other powerful explosives now in use. The operation, which is of extensive use in quarrying, mining, and other branches of engineering, is often performed by boring a hole in the substance to be exploded, by means of an iron rod, called a jumper, filling it with gunpowder, and igniting this by means of a match, burning so slowly as to allow the parties employed to remove to a sufficient distance before the explosion takes place. At one time it was supposed that the force of the explosion depended on the firm packing of the gunpowder in the hole by means of small chips of stone, sand, etc. It has since been ascertained that loose sand is as effectual as firm packing, which in consequence has been generally laid aside. One of the most important modern improvements in blasting is the firing of the charge by electricity. This mode is more especially applicable to submarine blasting, and was first practised for that purpose by Gen. Pasley, in 1839. The only thing necessary is to make an interruption in the conducting wire at the point where the explosion is to take place. In passing the electric current, a spark produced at the interruption fires the charge. The effect being instantaneous the operator can fire any number of charges simultaneously. Gun-cotton is often employed in blasting, and nitro-glycerine has also been found to be a very powerful agent in such operations, but its use requires the utmost caution, as it is very liable to explode unexpectedly with most disastrous results. The same objection does not apply to dynamite, which is quite as effective and perfectly harmless when properly handled.

One of the greatest blasting operations ever attempted was the removal of the reefs in the East River, near New York, known as Hell Gate. An entrance shaft was sunk on the Long Island shore, from which the reef projected. From this shaft nearly 20 tunnels were bored in all directions, extending from 200 to 240 feet, and connected by lateral galleries. Upward of 52,000 pounds of dynamite, rend rock, and powder were used, and millions of tons of rock were dislodged. Numerous important improvements have been made in blasting by the substitution of rock boring machines for hand labor. Of such machines, in which the jumper or drill is repeatedly driven against the rock by compressed air or steam, being also made to rotate slightly at each blow, there are many varieties. See also **EXPLOSIVES**.

Blastomeryx. See **MERYCODUS**.

Blatchford, Samuel, jurist: b. New York, 9 March, 1820; d. Newport, R. I., 7 July 1893. He graduated at Columbia, 1837; became secretary to Gov. W. H. Seward of New York, and practised law at Auburn, N. Y., as a member of the governor's firm, 1845-54. In 1854 he settled in New York as head of the firm of Blatchford, Seward, & Griswold. Though he attained success in general practice, it was his application to admiralty law that gave him his widest repute. On 3 May 1867 he was appointed judge of the United States district court for the Southern district of New York; in March 1878, judge of the United States circuit for the second circuit; and in March 1882 he became an associate justice of the United States supreme court. Here he continued to give close attention to admiralty cases, and also rendered important decisions on bankruptcy, copyright, patent, and libel causes. Publications: 'Reports of Cases in Prize in the Circuit and District Courts for the Southern District of New York 1861-5' (1866); 'Reports of Cases in the Circuit Court of the United States, Volumes 4-6' (1867-9); 'Circuit Court Reports for the Second Circuit, 1847-75' (12 vols. octavo); 'Reports of the Circuit Courts of the United States, Second Circuit, Volumes 13-20' (N. Y. 1877-83, 8 vols.); with F. Howland and E. R. Olcott, 'United States District Court Reports (Admiralty Cases Decided by Judge Betts) for the Southern District of New York, 1827-47' (N. Y., 2 vols. octavo).

Blatchley, Willis Stanley, naturalist: b. Madison, Conn., 6 Oct. 1859. He graduated at Indiana State University 1887, and was successively an assistant on the Arkansas Geological Survey 1889-90, a member of Scoville's scientific expedition to Mexico 1891, and assistant on the United States Fish Commission in 1893. In 1894 he was elected State geologist of Indiana, and re-elected 1898. Besides his annual reports his scientific writings include: 'Gleanings from Nature' (1899); 'Locustidæ and Blattidæ of Indiana' (1892); 'Some Indiana Acrididæ' (1891-8); and 'Descriptions of New Species of Orthoptera.'

Blat'tidæ. See **COCKROACH**.

Blaubok, blow'bök, a large antelope of South Africa (*Hippotragus niger*). It is of a

BLAUVELT — BLEACHING

bluish hue, and has long, stout horns which sweep back from its forehead like those of its relatives, the isabel and equine antelopes. It formerly occurred in large herds, but had a limited habitat, and is now probably extinct.

Blauvelt, blow-vélt, **Mme. Lillian Evans** (MRS. WM. F. PENDLETON), prima donna: b. Brooklyn, N. Y., about 1870, of Welsh and Dutch ancestry. When eight years old she made her début as a violinist. She studied (voice) with M. Jacque Bouhy, of Paris, for three years. Her début in opera was made at the Theatre de la Mormari, Brussels, and she has taken the principal roles in 'Faust,' 'Romeo and Juliet,' 'Myna,' etc. Of late her work has been chiefly in concert and oratorio. Besides Great Britain, Canada, and the United States, she has sung in Russia, Germany, France, Italy, Holland, Belgium, Austria-Hungary, and Switzerland.

Blavatsky, bla-väts'ke, **Helene Petrovna**, Russian theosophist: b. Yekaterinoslay, Russia, 1831; d. London, 8 May 1891. She traveled in all parts of the world and succeeded in entering Tibet. In 1873 she came to the United States, founded the Theosophical Society in New York, and aided in establishing 'The Theosophist.' She studied the East Indian esoteric doctrines and Buddhist philosophy, and by her writings contributed to make this philosophy popular. She wrote 'Isis Unveiled'; 'The Secret Doctrine'; 'Key to Theosophy.'

Blazing Star. Various hardy perennial plants. See **LIATRIS**.

Blazonry, the art of describing a coat of arms in such a way that an accurate drawing may be made from the verbal statements given. To do this a knowledge of the points of the shield is particularly necessary. Mention should be made of the tincture or tinctures of the field; of the charges which are laid immediately upon it, with their forms and tinctures; which is the principal ordinary, or, if there is none, then which covers the fess point; the charges on each side of the principal one; the charges on the central one, the bordure—with its charges; the canton and chief, with all charges on them; and, finally, the differences or marks of the cadency and the baronet's badge.

Bleaching (Fr. *blanchiment*, "whitening"), the process of removing the coloring matters from fabrics of cotton, linen, wool, silk, etc., or from the raw materials, and also from straw, wax, and other substances, and leaving them perfectly white. Steeping cloths in lyes extracted from the ashes of plants, appears to have been practised by the ancient Egyptians for this purpose. In modern times the Dutch have almost monopolized the business, at least till within about 100 years. Previous to this time the brown linens manufactured in Scotland were regularly sent to Holland to be bleached. A whole summer was required for the operation; but if the cloths were sent in the fall of the year, they were not returned for 12 months. It was this practice which caused the name of Hollands to be given to these linens. The Scotch introduced the business of bleaching for themselves about the year 1749; but it was long believed that the peculiar properties of the water about the bleaching grounds of Haarlem gave to this neighborhood advantages which no other region could possess. The use of chlorine as a bleaching agent was first proposed by Ber-

thollet in 1785, and shortly afterward introduced into Great Britain, where it was first used simply dissolved in water, afterward dissolved in alkali, and then in the form of bleaching powder, commonly called chloride of lime, the manufacture of which was suggested by Mr. Tennant, of St. Rollox, Glasgow, in 1798. At first he passed the chlorine into milk of lime, and thus obtained the solution known as bleach liquor. In 1799 he took out a patent for absorbing chlorine by dry lime, and thus obtained bleaching powder. Bleaching powder has little bleaching action till the chlorine is liberated by the action of an acid. The best bleaching powder contains about 36 per cent of available chlorine; that is, chlorine which is liberated by acid.

In Silesia and Bohemia, where the chlorine process is not adopted, the linens are exposed to a fermenting process, then washed, and steeped in alkaline liquors, with alternate exposures upon grass, which processes are repeated a great number of times for 60 to 70 days; but to render them properly white, they are afterward passed through a bath acidulated with sulphuric acid, then treated again with the potash lye several times and alternately exposed on the grass, and finally thoroughly cleansed by washing in a revolving cylinder called a dash-wheel. This machine is also employed in the English and Scotch processes for washing the goods without subjecting them to unnecessary wear. The frequent repetition of the different processes is rendered necessary by the complete diffusion of the coloring matters through the flax fibres, and their close union with them; each operation decomposing and removing in succession small portions only.

In the bleaching of cotton cloth, the pieces, after being singed, by passing them over a red-hot plate or a semi-cylinder of iron or copper, are steeped in lukewarm water or old lyes, till they are completely soaked, which loosens any paste or filth got during weaving; they are then well washed through the dash-wheel, and put through the hydro-extractor or drying machine. If the cotton is in the hank, this process of steeping and washing is not required.

The mechanical operations of the bleaching house vary considerably, according to the quality of the goods and the facility for mechanical appliances. In the chemical operations of whitening the cloth there is little variation, further than that heavy fabrics require longer time and more frequent repetition of the processes. The first operation, after steeping and washing, is boiling. The boiling liquor is made by adding a quantity of water to slaked lime, and when the grosser particles of lime have settled to the bottom of the vessel, the milky liquor is put into the boiler, or, it may be, filtered through a cloth. Some bleachers use with the lime a little carbonate of soda; the quantity of lime varies from four pounds to eight pounds for every 100 pounds of cotton, and from one pound to two pounds of soda ash, where this is used. The boilers used for boiling the goods are called *kiers*, and many kinds are used, the boiling liquid being made to shower over the goods and percolate down through them. This is effected by having a false bottom or frame fitted inside the boiler at about one third of its depth from the bottom, upon which the goods are laid. The space between the false bottom

BLEACHING

and real bottom of the boiler is filled with the liquor or lye, connected with which is a pipe leading to the top of the boiler. When the heat is applied, either by steam or fire, and the liquor begins to boil, it is forced up through this pipe, which is made to shower its contents over the surface of the goods. This boiling is continued, according to the quality of the goods, from 6 to 12 hours. The goods are now removed from the boiler and washed in water; they are then passed through dilute hydrochloric acid, again washed, and boiled for 12 hours with dilute caustic soda, after which they are passed into a solution of bleaching powder contained in a large stone or wooden trough or cistern, where they are left for from two to four hours. The bleaching solution is prepared by first dissolving a quantity of bleaching powder in water in a large cask and allowing the whole to settle; a quantity of the clear liquor is then drawn from the cask and put into the large bleaching cisterns, which have been previously nearly filled with water. To ascertain the necessary quantity of this strong bleaching liquor to be added to the troughs or cisterns, a certain measure of sulphate of indigo is taken in a graduated vessel, termed a test glass, and then, according to the number of graduated measures of the bleaching solution required to decolor the sulphate of indigo, the strength of the bleaching liquor is regulated. These test glasses and sulphate of indigo are carefully prepared for the purpose.

Instead of dash wheels, a more improved method of cleaning and washing is adopted by some bleachers previous to boiling the goods. They are all sewed together, end to end, making one line of the whole. This line of pieces is drawn along by machinery between rollers and squeezers, with a plentiful supply of water, and having been thus thoroughly washed and cleaned, is at last laid out by a mechanical contrivance into the bleaching trough. The goods are allowed to steep in the bleaching liquor from two to four hours; they are then lifted and washed, either by the dash wheel or rollers, as before, and are then laid in a sour, made by adding about one pint of hydrochloric or sulphuric acid to every four gallons of water. After steeping in the sour for four hours, the goods are again washed, as before, and are subjected to another boiling for eight hours; but this time the lye is caustic soda or potash, generally the former, made caustic by boiling together a quantity of soda ash and slaked lime, and allowing the sediment to settle, and using only the clear solution. About eight pounds of soda ash suffice for 100 pounds of goods. After the boiling the goods are again washed and steeped in the bleaching liquor for eight hours, and again washed and soured—the sour in this case being always made with sulphuric acid. Light fabrics require no further treatment; but heavy fabrics need a clearing process, which is a repetition of the last course, the liquors being generally, however, a little weaker, and the processes shorter. Cotton, in the hank, undergoes the same operation, except in the washings, which are performed by hand, not with the wheel. The goods being bleached and dried by the extractor, are now prepared for the operations of finishing. For this purpose they are stretched by women to their breadth, and the folds, as much as possible, taken out by beating them; then they are stitched together by the

ends with a sailor's needle, and being thus prepared for the mangle the cloth is now starched, common wheat flour and a portion of porcelain clay being employed. It is then subjected to the action of the stiffening machine, and having been thus impregnated with starch, the superfluous portion of which is pressed out as it passes through the rollers above, the goods are then hung upon rails in an apartment, called the stove, heated by two furnaces from which flues are led through the room. The heat thus generated is sometimes so great that the workmen, in hanging up the cloth, are obliged to throw off most of their clothes. When the goods are dried thoroughly, they are taken from the stove and carried to the damping machine, where they are subjected to the action of a shower of water. When the cloth comes from the damping machine, it may be seen covered with wet spots, the greater portion, however, being dry; but after remaining some time it becomes uniformly damp. The goods are now passed through the calender; they are then regularly folded and put into a Bramah press, with a sheet of pasteboard between each, and, being sufficiently pressed, they are then finished for the market. The process has been greatly shortened by the introduction of the Mather-Thompson process (1884). In this process an important feature is the use of the steamer kier, in which the goods are submitted to the action of low-pressure steam. The material is passed through soda lye, squeezed, and washed; then through boiling caustic soda, squeezed, and run into a steamer kier, where it is boiled for four hours under a pressure of four pounds, washed with hot water, and then passed continuously through a series of vats containing water, bleaching powder solution, carbonic acid gas, water, alkaline solution, water, bleaching powder, carbonic acid gas, water, hydrochloric acid.

The bleaching of linen is conducted after a similar manner to that of cotton; but there is much more coloring matter in the former than in the latter, and it is therefore found necessary in the bleaching of linen to repeat the boiling in lye and the steeping in chloride of lime three or four times. An electrolytic method of bleaching (the Hermite process) has recently been introduced. The chlorine for bleaching is liberated by the action of an electric current on solutions of calcium or magnesium chloride. Wool and silk cannot be bleached with chlorine, so sulphur dioxide, usually prepared by burning sulphur, is used instead. In the case of wool, the material is well washed with water and scoured with alkaline solutions to remove fatty matters. It is then exposed, while still wet, to the action of sulphur dioxide in a brick chamber for six or eight hours,—or it may be soaked for several hours in a solution of sulphurous acid,—after which it is well washed. Silk is treated with dilute acid, then worked in a soap bath for about 20 minutes to remove the gummy matter present, after which it is rinsed, tied up in bags of cotton, and boiled for from one to three hours in water, and rinsed in dilute alkali and finally in water. The bleaching is effected by stoving in sulphur dioxide, exactly as in the case of wool. In place of sulphur dioxide, hydrogen peroxide is coming into use for both wool and silk bleaching.

BLEACHING POWDER—BLEEDING

Bleaching Powder, a compound of lime, chlorine, and oxygen, greatly used for bleaching purposes, and as a disinfectant. It is commonly known also as "chloride of lime," a name somewhat unfortunately chosen, since it appears to imply that the substance is simple chloride of the element calcium, which is far from being the case. Its precise chemical nature has never been satisfactorily demonstrated, but it is believed to consist essentially of a mixture of calcium chloride and calcium hypochlorite. In preparing bleaching powder on a commercial scale, slaked lime is spread out, in a thin layer, on the floor of a chamber constructed of stone, or lined with lead. Chlorine gas is then admitted to the chamber, and allowed to act upon the lime until the latter has absorbed considerable of it, and has been superficially transformed into the substance desired. The lime on the floor is then thoroughly raked over, so as to expose a fresh surface to the chlorine, and the process is continued until samples of the powder, withdrawn for the purpose of analysis, are found to contain about 37 per cent of available chlorine. The lime used in the process should be as free from magnesia as possible, as otherwise more or less of the chlorine is wasted by the formation of undesirable compounds of chlorine and magnesium. The chlorine used in the manufacture of bleaching powder has been largely produced, in the past by heating manganese dioxide with the hydrochloric acid obtained as a by-product in the manufacture of soda from common salt. The tendency in recent times, however, has been toward the more direct manufacture of soda by the electrolysis of a solution of salt in water. Free chlorine gas is given off at the anode during this electrolytic process, and this is now largely utilized for the manufacture of bleaching powder; bleaching powder and soda being both produced in the same factory. Large works embodying this idea are in operation at Niagara Falls, and most of the soda and bleaching powders manufactured in the United States now come from that place. Bleaching powder is white, or nearly so, and has a strong smell of chlorine. Its disinfecting properties are supposed to be due to the slow liberation of that gas, which is a powerful germicide.

Bleak, or BlicK (*Leuciscus alburnus*), a small river fish, six or seven inches long, of the carp family. It somewhat resembles the dace. Its back is greenish, otherwise it is of a silvery color, and its silvery scales are used in the manufacture of artificial pearls. It is a good food fish.

Bleak House, a novel by Charles Dickens (1853). Its secondary theme is the monstrous injustice and even ruin often wrought by delays in the old Court of Chancery, which defeated all the purposes of a court of justice.

Blechen, Karl Eduard, kārĭ ēd'oo-ard bhēn'ēn, German landscape artist: b. Kottbus, 1798; d. 1840. After studying art in Italy for some years he settled in Berlin in 1830 and became professor at the Academy of Fine Arts there in 1835. The first representative of the Berlin landscape school, he painted 'Villa Este'; 'Villa Borghese'; 'View Near Nami'; 'View of Naples'; 'View at Tivoli'; etc.

Bled'soe, Albert Taylor, American clergyman and writer: b. Frankfort, Ky., 9 Nov. 1809; d. Alexandria, Va., 1 Dec. 1877. He was assistant secretary of war of the Southern Confederacy, and successively an Episcopal and a Methodist minister. He was also professor of mathematics at Kenyon College and at Miami University, 1833-6. Besides editing the 'Southern Review' and contributing frequently to leading literary, scientific, and theological periodicals, he wrote 'Examination of Edwards on the Will' (1845); 'Theodicy' (new ed. 1853); 'Philosophy of Mathematics' (1868); etc.

Bleecker, Ann Eliza, American poetess, daughter of Brandt Schuyler: b. New York, October 1752; d. Tomhanick, near Albany N. Y., 23 Nov. 1783. She married, in 1769, John J. Bleecker, and moved to Tomhanick, whence she was driven by the news of the approach of Burgoyne's army. Her husband had already left to provide means of escape, when she was obliged to fly on foot, in the midst of her family, and of a crowd of other helpless persons, for refuge from the advancing savages. After enduring great horrors and distresses, they made their escape to Albany, and thence by water to Red Hook, where they remained until the surrender of Burgoyne enabled them to return to their home. Her poems were written as suggested by occasions, without a view to publication. She possessed a sportive fancy, with much tenderness of feeling, but the sad experiences of her life produced upon her such an effect, that she destroyed "all the pieces that were not as melancholy as herself." Her poems are to be found in the earlier numbers of the 'New York Magazine,' and a collection of her stories and "poetics" in a volume published in 1793, by her daughter Margaretta.

Bleeding, the escape of blood from the arteries or veins. Bleeding may be external, and thus readily seen and prevented by proper surgical measures, or it may take place internally, into one of the large body cavities, and is then a serious matter. The amount of blood that is in the human body varies from one tenth to one twelfth of the weight of the individual, and of this from 40 to 60 per cent may be lost without resulting in death from the direct effects of bleeding. Death may result in some individuals from the loss of much smaller quantities, but most persons can lose two fifths of their blood and not die. Bleeding varies widely in its rapidity. Some wounds ooze, others well-up, and again bleeding may be very rapid when a large vessel has been cut.

Bleeding from a vein or an artery may be recognized by the dark color and regular flow from the former, and the brighter red and spurting or throbbing flow from the latter. If bleeding is taking place while pressure is being applied to a cut these differences may not be so pronounced. In emergencies bleeding from an artery may be stopped by direct and hard pressure of the carefully cleaned finger immediately over the source of the issuing jet of blood. This pressure must be hard and continued. This will permit time to find the chief artery that is supplying the bleeding vessel, and as soon as this is found pressure upon it will further aid in suppressing the flow. Thus the brachial artery can be found on the inside of the arm by feeling on the patient's well side, and firm pres-

BLEEDING HEART YARD—BLENDE

sure on it will stop all bleeding in the parts below, as in a cut wrist or cut hand. Pressure on the femoral artery in the groin will control all bleeding below the point of pressure. As pressure by means of the finger is difficult to maintain, an improvised apparatus may be made of a knotted napkin or large handkerchief. This may be placed about the arm or leg, the knot brought to press on the artery and then by means of a short stick the whole may be made to tightly compress the entire limb. (See *TOURNIQUET*). Pressure of this kind should not be too prolonged, or serious damage to the parts may result. Venous bleeding is usually controlled by direct pressure of the limb on the side away from the heart and by direct pressure of antiseptic gauze. In oozing, direct pressure of antiseptic gauze or direct application of hot water, 118-120° F., is most effective. Powders, cobwebs, iron, alum, etc., are not advisedly used.

Internal hemorrhage is extremely important, since the blood cannot be seen, and one has to rely on the symptoms solely. These are usually a beginning sense of faintness or weakness, and perhaps some nausea. The extremities commence to get cold and white, the face becomes pale and anxious, and the patient may commence to have air-hunger. He desires the windows to be opened wide, thinking thereby to get more air. Thus the beginning symptoms are very similar to those of a severe fainting spell. But as the bleeding continues there is increasing restlessness with increased air-hunger; there may be cold, clammy sweat over the patient's body; there is sighing to gasping respiration, and the heart-beat is hard to hear and it may be impossible to feel the pulse beat. The patient may die in convulsions, the face becoming deeply cyanosed, and the respirations spasmodic or convulsive in type. If the patient does not die he will have a long, tedious convalescence. Prompt medical or surgical aid is imperative in all such cases. The best temporary stimulant is an enema of hot (118-120° F.) salt solution, one teaspoonful to the pint, which is allowed to run in and out of the rectum, a quart or two at a time.

Bloodletting.—This procedure was one much in vogue in former years, and while still a most desirable operation to perform for certain types of disease, the conditions brought about by its use are now largely induced by other means. In conditions of poisoning, some cases of pneumonia, and in some apoplexies, bleeding is still performed by competent medical practitioners, and is advocated in most manuals of practice. It is its indiscriminate use for all ills that has fallen out of favor.

Bleeders.—Certain individuals have a tendency to bleed inordinately from even the slightest wound. They are called "bleeders," and are frequently found in families, most of the members of which have like traits. The pulling of a tooth is often followed by continuous hemorrhage. The causes for this idiosyncrasy are not all known. In some an insufficient quantity of calcium salts in the blood has been thought to be the most important cause.

Bleeding Heart. See *DICENTRA*.

Bleeding Heart Yard, a squalid locality in London, mentioned by Dickens in 'Little Dorrit.' The origin of the name is unknown.

Bleek, Friedrich, frēd'rīn blāk, German biblical scholar and critic: b. Arensbök, Holstein, 4 July 1793; d. 27 Feb. 1859. He was appointed professor of theology at Bonn, 1820, and spent the remainder of his life there. He was the author of much esteemed commentaries and expository books, valuable Introductions to the Old and New Testaments (1860-2), his most important work being one on the 'Epistle to the Hebrews' (1828-40).

Bleek, Wilhelm Heinrich Immanuel, vīl'hēlm hīn'rīn īm-mān'oo-ēl, German philologist, son of Friedrich Bleek (q.v.): b. Berlin, 8 March 1827; d. Cape Town, 17 Aug. 1875. In 1855 he went to South Africa and devoted himself to the study of the language, manners, and customs of the natives. In 1860 he was appointed public librarian at Cape Town, and his researches were rewarded with a pension from the civil list. He was principal author of the 'Handbook of African, Australian, and Polynesian Philology' (1858-63), his other chief productions being 'Vocabulary of the Mozambique Languages' (1856); 'Comparative Grammar of South African Languages' (1862); 'Hottentot Fables and Tales' (1864); and 'The Origin of Language' (1868).

Bleibtreu, Georg, gā-ōrn blīp'troi, German artist: b. Xanten, Rhenish Russia, 27 March 1828; d. Berlin, 16 Oct. 1892. His first important picture was the 'Destruction of the Kiel Turner-Corps at Flensburg' (1852) and his subsequent works are also battle pieces. Among them are 'Episode from the Battle of Waterloo' (1858); 'Battle of Königgratz'; 'Surrender of Napoleon after Sedan'; 'Attack of Saxon Corps at Saint Privat' (1880).

Bleibtreu, Karl August, kārł ow'goost blīp'troi, German poet and novelist: b. Berlin, 13 Jan. 1859. He is one of the foremost representatives of the youngest German school in literature, and a pronounced realist. All his views are radical, as shown by the very titles of his works; for example, 'Revolution in Literature' (1885); 'Literature's Struggle for Life.' He also wrote 'Dies Iræ'; 'Napoleon at Leipzig'; 'Cromwell at Marston Moor.' His dramas are: 'Lord Byron' (1888); 'The Day of Judgment'; 'The Queen's Necklace'; etc.

Bleichröder's, blīh'rē-dērz, a celebrated banking house in Berlin, established by Samuel Bleichröder, who died in 1855, continued by his son, Gerson Bleichröder, who died in 1893, and subsequently by the two sons of the latter. Under the patronage of Bismarck it entered into commercial relations with the Prussian government, rendering material assistance in 1866 and again in 1871. Gerson Bleichröder was raised to the hereditary peerage in 1872.

Blemmyes, blēm'ī-ez, or **Blemyes**, a people of ancient Ethiopia, who for several centuries after Christ gave much trouble to the Romans during their occupation of northern Africa. Their influence extended to a period as late as the 7th century.

Blende (German, "to blind," in allusion to the fact that the mineral is easily mistaken for galena, and yet yields no lead). A native sulphide of zinc, having the formula ZnS, and known also as sphalerite. It crystallizes in tetrahedral forms belonging to the isometric

BLenheim — BLenheim HOUSE

system, and has a very perfect cleavage. It is commonly brown, black, or yellow, but may have other colors also, and may be nearly colorless when pure. Its hardness is from 3.5 to 4, and its specific gravity is about 4.0. It usually occurs massive, with distinct cleavage. Blende occurs commonly in connection with galena, and also in deposits of considerable extent, in cavities in limestone. It is a valuable ore of zinc, and is mined in Saxony, in Cornwall (England), and in various parts of the United States, notably in Missouri, Illinois, Iowa, Wisconsin, and New Jersey. The miners of Cornwall call it "mock lead" and "black-jack."

Blenheim, blén'ím, or **Blindheim**, a Bavarian village about 23 miles from Augsburg, the theatre of a great battle, fought 13 Aug. 1704 (also called the battle of Höchstädt, from another village of this name in the vicinity), in which Marlborough and Prince Eugene, commanding the allied forces of England and the German empire, gained a brilliant victory over the French and Bavarians. The latter armies were drawn into the engagement under the most unfavorable circumstances. Both these armies amounted to 56,000 men, while the forces of Marlborough and Eugene were about 52,000. The first had thrown their troops chiefly into the two villages of Blenheim and Kinzingen, which they considered as points of support for their wings, though at too great a distance in front of their main position. A large proportion of cavalry was in the centre, since each army, the Bavarian as well as the French, had their horse on their wings, and in this way those of two wings must necessarily join each other. Both the commanders would undoubtedly have perceived and corrected this mistake, as Tallard, the French general, had in Blenheim alone 27 battalions of infantry; but they expected so little to be attacked, that when the line of the allies began to move, 13 August, at two o'clock in the morning, they supposed them to be marching off. The greatest part of their cavalry was sent to forage. Even at seven o'clock, when the heads of the eight columns with which Eugene and Marlborough advanced toward the Nebelbach were to be seen, Tallard thought the whole a stratagem intended to cover the retreat; but he soon saw his error. The dispersed troops were recalled in the greatest hurry, and the cannon were drawn up in line. The French and Bavarians made every exertion to prevent the passage of the enemy over the small stream of Nebelbach, and the capture of the two villages, the conquest of which was considered by Marlborough and Eugene as decisive. Their line of attack was uncommonly long, about four and a half miles. Marlborough, in order to secure his right wing, attacked Blenheim, but without success; he then changed his plan, and threw himself with his principal forces into the wide interval between the right wing and the centre of the enemy, leaving only as many troops before Blenheim as were necessary to check the body which occupied this position. At five o'clock in the afternoon he succeeded, after great efforts, in passing the Nebelbach, by which his victory was decided. Tallard himself was among the pris-

oners; his son was killed. The consequences of the battle were decisive. Bavaria, as Marlborough had anticipated, fell into the power of Austria.

Blenheim Dog. See TOY TERRIERS.

Blenheim House, the name of the seat of the Duke of Marlborough, in the parish of Woodstock, and county of Oxford. The estate having been given by Queen Anne to Marlborough for his eminent services, Parliament granted the sum of half a million sterling to erect a suitable family seat. The building was intrusted to Sir John Vanbrugh, and called Blenheim, from the village where the Duke gained his great victory. In this park once stood the royal palace of Woodstock, where Alfred is said to have resided, and which was the favorite residence of Henry II., who erected a house in the park for his favorite mistress, Rosamond Clifford, whence the well-known legend of Woodstock-bower, Queen Eleanor, and the Fair Rosamond. Edward III. was also much attached to this palace, in which his eldest son, the illustrious Black Prince, was born, as well as his youngest son, Thomas, Duke of Gloucester, usually called Thomas of Woodstock, from that event. Richard II. likewise kept his court here, at which time the poet Chaucer resided at Woodstock, in a house which stood near the present entrance to the park. During the civil wars of the 17th century it was for some time defended for the king; but it ultimately surrendered, and was much injured and dilapidated by the parliamentarians. The usual approach to Blenheim from Woodstock is through a triumphal arch or portal. In front of the building stands a sculptured column 130 feet high, surmounted by a statue of the duke, whose victories and achievements are recorded on tablets round the base. The front of the house measures 348 feet from wing to wing, and although architectural critics find many faults in detail, the general effect is in the highest degree noble and commanding. The interior is extremely magnificent; the hall, supported by Corinthian pillars, is 67 feet high; and the ceiling was painted by Sir James Thornhill, the design representing Victory crowning the Duke. The gallery and bow-window room abound in portraits by the most eminent masters, both foreign and English. On the tapestry of the latter are figured the various battles gained by the same great general, and more especially that of Blenheim. The saloon, a noble and spacious apartment, communicates with the hall, and occupies the entire breadth of the centre. The lower part is lined with marble, and six of its compartments are decorated with pictures by La Guerre, representing the inhabitants of the different nations of the world in appropriate costume. On the ceiling is a representation by the same artist, of the victorious Duke arrested in his career by Peace and Time. The remaining principal subjects of admiration are the library, theatre, state drawing-room, blue and green drawing-room, grand cabinet, the dining-room, etc. In the chapel, which forms one of the wings, is a fine marble monument by Rysbrack, to the great Duke and his almost equally celebrated duchess, Sarah. The gardens and grounds,

which are exceedingly spacious, were laid out by Brown, who contrived to make a most admirable use of the small river Glyme in the formation of a lake, or piece of water, which is justly deemed one of the greatest beauties of the place. It is crossed by several arches, and at the middle or grand approach is a magnificent bridge, the span of the centre arch of which is 101 feet.

Blenker, blenk'ér, **Louis**, German-American soldier: b. Worms, Germany, 1812; d. October 1863. He took an active part in the revolutionary movement of 1848 in Germany and was forced to leave his native land, emigrating to the United States. He organized the 8th regiment of New York Volunteers at the outbreak of the Civil War, and was its colonel. He was promoted to the rank of brigadier-general at the first battle of Bull Run, and engaged in the battle of Cedar Keys in 1862. He died of wounds received while at Warrenton, Va.

Blennerhas'sett, **Harman**, English emigrant on America: b. Hampshire, England, 8 Oct. 1764; d. on the island of Guernsey, 2 Feb. 1831. He sprang from a wealthy and highly connected house which traced its ancestry back to Edward III.; was educated at Westminster School, London, and Trinity College, Dublin, graduating 1790. The youngest of three sons, he studied for the law, but the death of his brothers soon after made him head of the family. Early in 1796 he privately married his sister's daughter, Margaret Agnew, a beautiful and highly accomplished girl of 18, also of excellent family, her father having been lieutenant-governor of the Isle of Man, and her grandfather an English officer killed at Germantown. This incestuous union brought its ultimate punishment from nature in a family of physical and moral wrecks; but a more immediate one was entire social ostracism, which soon drove him to break his entail and sell his estates, except some reserved incomes, and come to America with his wife and a library and philosophical apparatus. Arriving 1 Aug. 1796, he finally, in 1798, settled on a small island in the Ohio River a few miles below Parkersburg, W. Va., and spent \$60,000 on a house and grounds, pictures, and statuary. This was for years the show place of America west of the Alleghanies, and drew a stream of notable guests, whom he entertained with elaborate hospitality. Here he read, made music, which was his chief passion, and dabbled in feeble absent-minded scientific experiments. In 1805 Aaron Burr (q.v.) was one of his guests, and then or next year induced him to join in the scheme for a southwestern empire, to include Mexico; Blennerhassett was to be prime minister and a duke, and perhaps ambassador to England. He was a timid, dreaming, futile, unadventurous man, but, like many such, may have fancied himself a great statesman and hero *in posse*. He may, perhaps, have consented because Mexico was farther from Great Britain than the Ohio, and the canker of his life was fear lest chance should disclose his secret to his friends and children. His wife, much the stronger nature of the two, was certainly ambitious for him, and he would not have embarked in such a

venture without her approval. Anyway, he advocated Burr's "colonization" plan in the papers, and invested a great sum in arms, ammunition, provisions, boats, etc., on the faith of obligations from Burr's son-in-law Allston, which were largely defaulted. The scheme fell through; Blennerhassett was twice arrested, imprisoned and tried for treason, but discharged in 1807 on the acquittal of Burr. His place, however, had been wantonly injured by the militia, and was seized by his creditors and turned into a hemp field. The mansion was converted into a granary and was finally burned by accident. Blennerhassett now settled in Natchez, and soon after bought a 1,000-acre cotton plantation on the Mississippi, a few miles above Port Gibson, which he called La Cache. It was unsuccessful, and the War of 1812 injured his commercial speculations; and in 1819 he sold it for \$28,000 and removed to Montreal, practising law in hope of obtaining a judgeship through his old schoolmate, the Duke of Richmond. This failing, he returned to England in 1822 in hope of winning back his property by a reversionary action and then of obtaining employment through an influence which no longer existed. In 1824 he came back after his family. Everything failed him, though he and his wife were decently treated; at last his health gave way, and he died at Port St. Pierre on the island of Guernsey. He was generous with his money while he had it, and helped out of financial difficulties several of the musicians he consorted with. His wife, though disinherited, had always had an income paid her by her sisters; and in 1838 received a property by the will of her husband's maiden aunt. In 1840 she came to the United States to push a claim before Congress for the island property, and indemnity for the ravages of the militia. Henry Clay favored it, and its passage was probable; but before it came up she died in New York, 16 June 1842. The story of her being left penniless with a dependent family (the youngest was 19 at his father's death), and of her dying in poverty and being buried by sisters of charity, are fictions. She had some literary ambitions, and while in Montreal wrote two volumes of verse, 'The Deserted Isle' (1822), and 'The Widow of the Rock, and Other Poems' (1824).

Bibliography.—Thérèse Blennerhassett-Adams, 'The True Story of Harman Blennerhassett,' in the 'Century' (Vol. 62 1901); 'The Blennerhassett Papers' (1864); Safford, 'Life of Blennerhassett' (1835); Pidgin, 'Blennerhassett,' a romance (1902).

Blenny. These small fishes of the spiny-rayed marine family *Blennida*, frequent rocky coasts and shallows, in seas of all parts of the world. Their elongated bodies, some of which are scaleless, are remarkable for the abundance of slimy matter with which they are covered. These fishes are extraordinary in possessing but one dorsal fin, which in some species is deeply divided; and in having the faculty of using their ventral fins to aid them in moving about among the rocks and sea-weed. They are frequently deprived of water, by the ebb of the tide, when they are capable of subsisting for some hours. Small

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crustaceans form their main food. In some species the eggs are retained in the oviduct until they hatch, so that the young are produced alive.

Blenorrhœa, an old term signifying a muco-purulent discharge from any mucous membrane. This discharge is usually creamy white and consists usually of water, mucus, epithelial cells, white blood cells, or pus cells, and bacteria. At the present time a blenorrhagic discharge is definitely named according to the structure involved. Thus a blenorrhœa of the eyes is termed a purulent conjunctivitis; of the vagina, leucorrhœa; of the urethra, gleet or urethritis; if a urethritis of infectious origin, gonorrhœa, etc. Treatment is usually local and general. Tonic stimulating applications may be locally applied, and the general health built up as thoroughly as possible.

Blepharitis, an inflammation of the margin of the eye-lids and hair follicles. It may consist of a very slight hyperæmia or redness that causes itching and discomfort. This form may be due almost entirely to eye-strain and proper glasses will usually cure it. The disease may be more extensive, involving the margin and the follicles, with redness and swelling and whitish scales. The eyelashes may drop out, but usually are regrown, and there is much itching and discomfort. This form may also result from refractive errors, or may be the index of a bad constitutional state from poor food, bad surroundings, or it may follow the infectious diseases, notably measles. A more persistent form is associated with ulceration and loss of the eyelashes. This is usually a very chronic type and resistant to treatment. In the management of all forms, all errors of refraction should be corrected by properly adjusted glasses,—not on opticians' prescriptions,—and the local treatment by stimulating ointments.

Bléré, blâ-râ, a French town, in the department of Indre-et-Loire, on the Cher, 15 miles east-southeast of Tours. It contains a notably fine 16th century chapel. Pop. (1896) 3,269. In the vicinity is the Château Chénonceaux, built in the time of Francis I., and still in excellent preservation. It was given by Henry II. to his mistress, Diana de Poitiers, who was dispossessed on the death of Henry by Catherine de Medici. In the latter part of the 18th century it was frequented by Fontenelle, Voltaire, Rousseau, and all the wits of the time, who were drawn together by the then owner of the château, Madame Dupin, widow of a *fermier-général* who died in 1799. See Cook, 'Old Touraine.'

Bles, Henri, ðn-rê' blës, Flemish painter: b. probably at Dinant, about 1480; d. 1550. Very little is known of his career, and the 'Adoration of the Magi' in the Dresden Gallery is his only signed picture. He is known to have been a very prolific artist, and almost all the European galleries contain paintings ascribed to him.

Blesbok, blës'bök, one of the African hartbeests, now rare, which was distinguished by the violet color of its coat. See HARTBEEST.

Blessing, or **Benediction**. The expression of wishing one well soon gave rise, in early ages, to a solemn act, accompanied, like other solemnities of those periods, by symbolic signs; this was the blessing or benediction. In patriarchal times, when the authority of the head of a family included that of the priest and the civil ruler, the blessing of course appertained chiefly to him, on account of his venerable character, and when the priests began to form a separate class, became, in certain cases, a prerogative of theirs. As the authority of the father, in the infancy of every nation, is extremely great, the idea soon sprung up that his prayers, invoking the favor of the Deity, were more effectual than those of others, and that whatever he blessed would be likely to receive the favor of God. The same importance was soon attributed to blessings conferred by a priest. The heathens, the Jews, and many Christian sects, have cherished this idea. By the Jewish institutions, certain benedictions were reserved to the priest; the same is the case in the Roman Catholic Church, in which different benedictions are appropriated to different degrees of the clergy. We shall mention only a few of them. The Roman Catholic bishops alone can confer those benedictions which are connected with unction, and are called consecrations, as, for instance, the consecration of kings and queens, of the cup and *patra*, the church and altar. To them also is confined the benediction of abbots and abbesses, of knights, and the holy oil. For the benediction of the holy vestments, etc., they may employ a substitute. Every Roman Catholic clergyman may confer the benediction on the occasion of betrothment; also the marriage benediction; may bless the fruits of the earth, and the holy water. The benediction of a bishop is eagerly sought for by a faithful Roman Catholic, as contributing peculiarly to his spiritual welfare; and the Catholic clergy, in general, use the benediction as a salutation or reward for a service, etc. When the Pope rides or walks out the Roman Catholics kneel to receive his blessing, which he gives by a motion of his hand. In his ante-chamber are often seen things of different kinds, rosaries, etc., in large quantities, which he blesses in passing by. The Roman Catholic Church blesses things animate and inanimate, and this is believed by many to preserve them from sickness, injury, etc. Among most Protestant bodies there is a blessing pronounced upon the people at the close of a religious service, that of the Church of England being contained in the Prayer Book. Roman Catholics in many cases use the consecrated water in giving the benediction.

Blessington, Margaret (COUNTESS OF): b. Knockbrit, near Clonmel, Ireland, 1 Sept. 1789; d. Paris, 4 June 1849. She was the daughter of Edmund Power, and at the age of 15 was married to a Capt. Farmer, who died in 1817. A few months after his death she married Charles John Gardiner, Earl of Blessington. In 1822 they went abroad together, and continued to reside on the Continent till the Earl's death in Paris, in 1829, when Lady Blessington returned to London and took up her abode in Gore House, Kensington, which had been bequeathed to her by her husband. Here for many years she held those celebrated reunions and soirees, at which the most distinguished literary characters in London were wont to assemble. The

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fascination of her manners and conversation, with her genial warm-heartedness of character, rendered these gatherings most attractive; but certain equivocal circumstances in relation to her connection with a Count d'Orsay prevented their being frequented much by respectable female society. The count had married a daughter of Lord Blessington by his first wife, and been separated from her shortly afterward, but after the death of his father-in-law, resided with the countess during the remainder of her life. Lady Blessington had made her début as an authoress in 1822 by the publication of two volumes of 'Sketches.' In 1832 she contributed to the 'New Monthly Magazine,' 'Conversations with Lord Byron,' considered by many as the best of her productions. She also wrote numerous novels, including, among others, 'The Belle of a Season'; 'The Two Friends'; 'Strathern'; and 'The Victims of Society.' None of these have much literary merit, but describe scenes in fashionable life with considerable power, and enjoyed at the time a large share of popularity. She acted as editress for several years of 'Heath's Book of Beauty' and the 'Keepsake,' and also of another annual, the 'Gems of Beauty.' In 1849 she proceeded to Paris, whither Count d'Orsay had previously gone, in the hope of obtaining an appointment under Louis Napoleon, with whom they had been intimate during his exile in England. Consult Madden, 'Life of the Countess of Blessington' (1855).

Blicher, Steen Steensen, stān stān'sēn blī'h'er, Danish poet and novelist: b. Vium, Jutland, 11 Oct. 1782; d. Spentrup, 26 March 1848. His first work was a translation of 'Osian' (2 vols. 1807-9), and his first original poems appeared in 1814, but attracted little notice. He quickly won a national reputation with his novels, and in 1842 appeared his masterpiece of novel writing, 'The Knitting Room,' a collection of short stories in the Jutland dialect.

Blida, blē-da', a fortified town of Algeria, 30 miles inland from Algiers, well-built, with modern houses and public edifices, the centre of a flourishing district, and having a good trade. There are cedar and cork trees in the neighborhood and mines of copper and lead. The principal exports are oranges, grain, tobacco, raisins, etc. It is one of the chief stations on the railway connecting Oran, Algiers, and Constantine. Pop. (1896) 13,026.

Bligh, William, English navigator: b. Plymouth, England, 9 Sept. 1754; d. 7 Dec. 1817. He acquired considerable celebrity from having been the commander of the ship *Bounty* when the crew mutinied in the South Seas and carried her off. She had been fitted out for the purpose of procuring plants of the bread-fruit tree, and introducing these into the West Indies. Bligh, who had sailed with Capt. Cook, obtained the command, and in December 1787, left Spithead for Otaheite, where he arrived, and remained till April 1789. Having loaded his vessel with plants he set sail and was proceeding on his voyage for Jamaica when he was seized in bed, bound, and brought on deck. The launch was lowered, and Bligh, with 18 men supposed to be well disposed to him, were forced into it, with no other provision than 150 pounds of bread, 32 pounds of pork, a little

rum and wine, and 28 gallons of water. Thus scantily provided they found themselves in the open sea, not far from the island of Tofoa, in lat. 19° S. and lon. 184° E., and managed by admirable skill and perseverance, though not without enduring fearful hardships, to reach the island of Timor in 41 days, after running nearly 4,000 miles without the loss of a single man. Ultimately 12 of the number reached England. Of these, Bligh was one, and in a second voyage accomplished the object of the first by giving the bread-fruit tree to the West India Islands. When several of the mutineers were afterward tried at Portsmouth, sufficient evidence was obtained to show that Bligh himself was not free from blame, and had on many occasions been too much inclined to play the tyrant. This feature in his character was afterward manifested on a larger scale. In 1805 he was appointed governor of New South Wales, and acted so harshly that the other authorities interfered and put him in confinement. On his return he was made an admiral. See PITCAIRN ISLAND.

Blighia, blī'y-a, a genus of numerous trees and shrubs of the natural order *Sapindaceae*, the principal species of which is *B. saoida* (*Cuoania saoida* of some botanists), the akee tree indigenous to west tropical Africa and naturalized in the West Indies since the close of the 17th century. It is also planted in southern Florida. The tree attains a height of 30 feet, bears pinnate ash-like leaves and very fragrant whitish flowers, from which by crude distillation the colored people obtain a cosmetic and which would probably yield a valuable perfume under proper management. The rich, red fruits, as large as goose eggs, are used for dessert and largely also in cookery. In Jamaica the tree is cultivated as high as 3,000 feet above sea-level, although it can withstand slight frosts. *Cuoania anacardioides*, which also bears an edible fruit, has been introduced into California, and *C. elegantissima* is sometimes raised in warm greenhouses for its attractive foliage and racemes of white flowers.

Blight, an indefinite term applied to any diseased state of cultivated plants, but gradually being restricted to plant diseases caused either by bacteria or fungi. See sections on diseases in articles on various plants.

Blight, American, an English and Australian name for the woolly apple louse or "apple blight," one of the aphides (q.v.).

Blight-bird, a small insectivorous bird (*Zosterops caeruleus*) of New Zealand, which devours the "blight" or plant-lice on fruit trees. It is one of the white-eyes (q.v.).

Blimbing, Bilimbi, Cucumber-tree (*Averrhoa bilimbi*), a tropical tree of the natural order *Geraniaceae*, native of southern Asia, where it is largely cultivated and whence it has been introduced in other tropical countries. It is extensively raised in South America. The tree attains a height of 15 feet, bears racemes of red flowers followed by smooth cucumber-shaped green fruits as large as hen's eggs, which are highly esteemed for their acid pulp. The carambola (q.v.) is a close relative.

Blind, blīnt, **Karl**, German political agitator and writer on history, mythology, and Germanic literature: b. Mannheim, 4 Sept. 1826.

BLIND

He was educated at Heidelberg and Bonn, and from his student days till he settled in England in 1852 he was continually engaged in agitating or in heading risings in the cause of German freedom and union, being frequently imprisoned. The democratic propaganda has since been supported by his pen; and he has written political and biographical works: 'Fire-burial Among Our Germanic Forefathers'; 'Teutonic Cremation'; 'Yggdrasil, or The Teutonic Tree of Existence'; biographies of Freiligrath, Ledru Rollin, and Francis Deák.

Blind, Mathilde, German-English poet: b. Mannheim, 21 March 1847; d. London, 26 Nov. 1896. She went to England in 1849, and won fame by her writings: 'The Prophecy of St. Oran, and Other Poems' (Lond. 1881); 'Life of George Eliot' (1883); 'Madame Roland' (1886); 'The Heather on Fire,' a tale (1886); 'Ascent of Man' (1889); 'Dramas in Miniature' (1892); 'Songs and Sonnets' (1893); and 'Birds of Passage' (1895).

Blind. The loss of the sense by means of which man receives an idea of the world that surrounds him, clothed in light and color, is an event as melancholy as it is frequent. Blindness is different: (1) In its degrees, some persons being partially blind, retaining a slight perception of light, with the power of distinguishing very brilliant colors, and the general outlines of bodies; others being entirely deprived of the faculty of seeing. (2) In its causes: some men are blind from their birth; others have become blind by local diseases of the eyes,—for instance, —by inflammation, suppuration, cancer of the eye-ball, spots, films, tumors on the cornea (by which its transparency is destroyed), also by closure of the pupil, by a turbid state of the humors, by a debility of the optic nerve, or by general diseases of the body, violent fevers, nervous fevers, plethora, and tendency of the blood to the head, erysipelas in the face, smallpox, scarlet-fever, etc., or by excessive exertion of the eyes, by which the optic nerve is enfeebled; for which reason, some classes of mechanics and artists, as blacksmiths, laborers in glass and smelting houses, watch-makers, etc., not unfrequently lose their sight, and in northern countries, which are covered with snow for a long time, and which dazzle the eyes by the reflection of the sunbeams, as well as in the sandy deserts of Africa, blindness is a frequent complaint. Old age is sometimes accompanied with blindness, occasioned by the drying up of the humors of the eye, or by the opacity of the cornea, the crystalline lens, etc. There are several causes which may produce blindness from birth. Sometimes the eyelids adhere to each other, or to the eye-ball itself, or a membrane covers the eyes; sometimes the pupil of the eye is closed, or adheres to the cornea, or is not situated in the right place, so that the rays of light do not fall in the middle of the eye; besides other defects. Those who are born blind have no idea of vision, and are entirely destitute of all the ideas derived from the sense of sight. They cannot, therefore, be sensible of their misfortune in the same degree as those who have lost their sight at a later period. Experience has shown that those who acquire the power of seeing after being born blind, or having lost their sight in their childhood, form very different ideas of visible objects from other

persons. A young man, whom Cheselden couched for a cataract, at the moment he received sight imagined that all the objects which he saw were in contact with his eyes; he could not distinguish objects, although of very different forms. Those with which he was already familiar by the touch he examined with great attention, in order to recognize them another time; but having too many things to notice at once, he soon forgot all that he had observed. He wondered that those persons whom he loved most were not handsomer than others. Before he received his sight he had expressed a great desire to obtain this sense. The other senses of persons, who have been blind for a long time, become more exquisite, perhaps, because they are not subject to the distraction produced by the sight of so many objects. The blind, therefore, are often distinguished for a remarkable mental activity, and a wonderful development of the intellectual powers. Their touch and hearing, particularly, become very acute. Thus it is related of a blind man, who lived at Puseaux, in France, and was a chemist and musician, that he could accurately estimate the proportions of objects, could judge of the distance of fire by the degree of heat, determine the quantity of fluid in vessels by the sound it produced while running from one vessel into another, and the proximity of objects by the effect of the air upon his face. He determined very accurately the weights of bodies and the capacities of vessels. The celebrated Saunderson, professor of mathematics at Cambridge, lost his sight in his early youth. He invented several processes to facilitate his studies in arithmetic and geometry. His sense of touch was so acute that he distinguished spurious coins merely by letting them pass through his fingers, though they were so well executed that even skilful judges were deceived by them.

When it is a case of imparting instruction to persons destitute of sight, it is necessary to have recourse to the other senses to supply the want of the eye. If, for instance, we wish to teach them the arts of reading and writing, letters must be prepared which will be palpable to the touch, and the hand guided until they are able to copy them. If we wish to communicate to them a knowledge of the surface of the earth, globes and maps must be prepared with the divisions, etc., in relief. Knowledge obtained in this way must, of course, be acquired much more slowly than that received by the sight. The senses of touch and of sight differ in this respect, that the former ascends by degrees from the perception of parts to the perception of the whole, while the latter views the whole at a single glance. It is therefore evident that the blind cannot be instructed in the common schools destined for those who see: in the first place, because the means of instruction by the touch are wanting; and secondly, because the progress of the other children would be retarded by the slow apprehension of the blind pupils. (See **BLIND, EDUCATION OF THE.**)

The occupations in which the blind are found capable of engaging are such as the making of baskets and other kinds of wicker-work, brush-making, rope and twine-making, the making of mats and matting, knitting, netting, fancy work of various kinds, cutting fire-wood, the sewing of sacks and bags, the carving of articles in wood, etc. Piano-tuning is also successfully car-

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ried on by some, the typewriter is used by others and the cleaning of clocks and watches has also been occasionally practised by them. Skilled musicians are sometimes found among the blind.

Reading Room for the Blind.—By an act of Congress passed in 1879, entitled an Act to Promote the Education of the Blind, \$250,000 was set apart to be permanently invested in securities of the United States, the proceeds of which were to be applied, through the American Printing House for the Blind at Louisville, to the making of books and apparatus used in the education of the blind, to be annually distributed to the schools for the blind in the several States in proportion to attendance. For almost a quarter of a century this benefaction has been available for the youthful blind of the country in the schools, and the books in embossed characters have multiplied amazingly. The catalogue now embraces nearly or quite every title in popular literature and technical subjects, and as only the best books are printed in raised letters, the entire catalogue constitutes the finest and best library of equal numbers in the world. There is a steady increase in the number of visitors in the reading room for the blind in the library of Congress. To Helen Marr Campbell is given by many the credit of having taken the initial steps to procure this reading room. She was a frequent visitor to the crowded rooms of the old Congressional Library, and often found the experiences there far from agreeable. The few books for the blind were often difficult to obtain and equally difficult to read in cramped rooms, and too often under the scrutiny of curious and annoying strangers. Going to John Russell Young, then librarian, she made a request for a special reading room in behalf of the blind readers of Washington. He was quick to see the justice of the request, and at once placed the fitting up of Pavilion No. 7 in the new library in charge of the second assistant librarian, David Hutcheson. This is in the extreme northwestern corner of the ground floor of the great building and is a large and well-appointed room, with square bay windows and a groined ceiling resting upon massive pillars. The alcoves along the eastern wall are filled with the specially prepared books for the blind; the Bible, making so many large volumes that it completely fills one of the alcove shelves.

Dictionary for the Blind—The first general dictionary ever issued in any country or language was published in 1903 by the Maryland School for the Blind. It contains 40,000 words, with complete diacritical marks and definitions and fills 18 volumes. In the last 10 years more books have been printed for the blind than in all previous time. This is due largely to the rapid spread of the New York point system of printing for the blind. The new dictionary, as well as all the books from the Maryland School printing house, is printed in New York point. The American Printing House for the Blind at Louisville expends its annual subsidy of \$10,000 entirely in New York point printing. The annual appropriation of \$1,000 by the State of New York for the publication of general literature for the blind department of the State Library at Albany goes into New York point. The International Sunday-School Lessons go out weekly over the United States in New York point. Three periodicals are published in it. There is an excellent musical library in it, including a

dictionary of 6,000 musical terms. The Society of St. Francis Xavier uses the system in its publishing house for the blind.

Photophonic Books for the Blind.—A sheet of transparent paper contains, printed upon a black background, a number of small white squares, separated from each other by intervals one, two, or more lengths of a square in size. These squares, together with the intervals, represent the letters of the alphabet, exactly as do the dots and dashes of Morse. In order to enable the blind to read these letters, the printed sheet is placed in a frame between two thin plates of glass fully exposed to the light, and an opaque piece of cardboard, or some other material, with a square-shaped opening in the centre, is moved by the reader along the printed lines from left to right. Whenever the opening passes over one of the white transparent squares, the rays of light illuminating the printed sheet pass through this opening, and, by means of a photophonic apparatus, are changed into sound. In this way, the blind reader receives the letters in the form of sounds separated by longer or shorter intervals of silence, and his ear fulfills the functions of the eye.

Blind, Education of the.—When it is stated that prior to 1830 the blind of America were to be found "moping in hidden corners or degraded by the wayside, or vegetating in almshouses," it is the adult blind that is meant. Still blind children were occasionally found in these places, though it could scarcely be said that they were vegetating, as could be said of the untrained deaf children.

The British census of 1851 first showed the world that over 80 per cent of the blind are adults. Our schools for the blind were started, *first*, because of the wide-spread interest in the results of educating the young deaf and dumb, which furnished inspiration for new fields of educational endeavor; *secondly*, because the country was coming to the conviction that all the children of the state should receive education both as a matter of public policy and as a private right; and *thirdly*, because reports of what had been accomplished abroad in schools for the blind were being promulgated in our land. By 1830 the more progressive states of the east were ready to give their blind children school training. In that year the government first included in the national census the deaf and dumb and the blind. The work of the blind was to begin with scientific foreknowledge as to their number. In 1829 certain gentlemen in Boston obtained the incorporation of the "New England Asylum for the Blind." By a most fortunate circumstance, the interest and services were obtained of a graduate of Brown University, Dr. Samuel G. Howe, who after finishing his medical studies had chivalrously gone to the aid of the Greeks. Dr. Howe went at once to Europe to study methods of instruction. Upon his return, in 1832, the school was opened with six pupils. In New York the act of incorporation of the New York Institution for the Blind was passed in 1831; but funds were needed and no one went abroad to study methods. This school opened in March, 1832, antedating by a few months the school at Boston. In the very same year a German teacher of the blind, a Mr. Friedlander, most

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opportunately came to Philadelphia, in the hope of starting a school for the blind there. Having trained certain blind children he exhibited their accomplishments, *first*, to a few influential people, *secondly*, before a large audience among whom he distributed a leaflet, "Observations on the instruction of blind persons." A meeting of public-spirited citizens followed, funds were liberally contributed, fairs held, and the success of the cause was assured. The Pennsylvania institution for the instruction of the blind was opened in 1833, fully ten months before an act of incorporation was obtained. The three schools at Boston, New York, and Philadelphia are called the pioneer schools. All sprang from private effort and private funds. All were incorporated as private institutions, and remain so to this day. Two similar institutions for the blind have arisen in this country, that at Baltimore and that at Pittsburg.

The origin of the State schools differs from that of the type above given only in that classes of trained pupils from the earlier schools were exhibited before the state legislatures, as well as before the people. State appropriations followed and the institutions were inaugurated as state institutions. The new schools sprang into being with astonishing rapidity. There were in 1899 forty schools for the blind in the United States, and every State in the union makes provision for its blind of school age either in its own school or in that of a neighboring state. In our sparsely-settled country, especially west of the Alleghenies and south of Maryland, great efforts had to be made to find the children and still greater efforts to persuade the parents to send them to school. In certain states where the amount of the public fund seemed to preclude a special grant for the blind, pupils of this class were brought together in connection with a school for the deaf and dumb, forming "dual schools," as they are called. These institutions could not help being unfair to their blind contingent; for in nearly every such case the blind came to a school already established as a school for the deaf, and under the superintendence of a man especially interested in the education of the deaf; moreover, the number of the deaf pupils usually far exceeded that of the blind. There are still a few of these dual schools, but wherever possible they have been divided into two distinct institutions. In northern schools the colored blind are educated with the white; in southern schools it is best for the colored to have schools of their own. Both the whites and they prefer this arrangement. The first school for the colored blind was opened in North Carolina in 1869.

All the institutions for the blind were in their very inception schools. The pioneer schools imported literary teachers from Paris and handicraft teachers from Edinburgh. At first only the brighter class of pupils came under instruction. Teaching them was easy. They progressed with amazing strides; all was enthusiasm; exhibitions were called for and widely given (Dr. Howe's pupils gave exhibitions in 17 states); large editions of the various annual reports were exhausted. Soon, however, less bright pupils came to be admitted; then the curriculum of studies began to sober down to the practical and comprehensive one prevailing to-day. Whatever occupation the boy

or girl expects to follow after leaving school, it is assumed he will follow it better and thus live more happily and worthily if he has a general education. When, as was formerly the case, the period or term of schooling allowed pupils was shorter than it is now, they were not admitted before the age of eight or nine. Now that kindergarten departments have been universally added to the schools, the pupils are urged to enter at an early age; because experience has shown that at home these little blind folks are coddled rather than trained, so much so in fact that by the time many of them come to school their natural growth of body and mind has been so interfered with by inaction, that all the efforts of the schools cannot make up for lost time and opportunity. The principle of periodicity of growth has now come to be understood and the importance of applying the proper stimulus at the period most sensitive to it, comprehended. Children with good sight and hearing have got along without kindergarten training, and so have blind children, but of all the useful means of reaching and developing the average blind child none is so effective as the properly-conducted kindergarten. The practical knowledge of things comes to the blind through the hand, their fingers being veritable projections of their brains. Thus must their hands not only be trained to sensitiveness of touch but to be strong and supple, so that they may, indeed, be dexterous; for as their hands are so are their brains. The kindergarten cultivates ear and heart and hand and brain as nothing else does. Even color is not wholly omitted in kindergartens for the blind. Many see colors, and those who do not love to talk about them and certainly derive some indirect value for considering them.

Blind children with kindergarten training are more susceptible to instruction than those without it. Above this department the course of studies in American schools requires from seven to eight years, which means a primary, a grammar and a high school education, or instruction in object lessons, reading, writing, spelling, grammar, composition, arithmetic, history, physiology, botany, zoology, geology, physics, algebra, geometry, civics, English literature, typewriting and sometimes Latin and modern languages. Not a few pupils have fitted for college where they took the regular course with the seeing students, and from which they were graduated usually with distinction. Formerly much of the teaching was oral, which, in many cases, was apt to be more pleasant than profitable to the pupil. Since the general introduction of the embossed text book and tangible writing, the pupil has been forced to depend more and more upon himself, obviously with better results. In fact, the work has been growing more and more practical. The methods of teaching the blind correspond in general to those of teaching other hearing children. The common appliances have but to be raised and enlarged as in maps and diagrams, or simply made tangible, which may be done, for example, by notching an ordinary ruler so that the graduations can be felt.

Industrial training has been an integral part of the school course from the beginning. Recently educational manual training has been generally introduced as preliminary to the

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trades. Sloyd has been found especially adapted to the blind. The handicrafts—chair-caning, hammock-making, broom-making, carpet-weaving, and a few others, alone remain of all the many trades taught at one time or another in our schools. Manual occupations of some kind will always be taught, even were it evident that none of them would be followed by the blind as trades; for it is by doing and making that the blind especially learn best. Then, it is essential that they be kept occupied. In the past, before the introduction of such varieties of labor-saving machinery as the last half century has seen, many of the discharged pupils followed some manual trade and succeeded in subsisting by it. To-day this is less and less possible. The mind itself of the blind is least trammelled by the lack of sight; hence some pursuit where intelligence is the chief factor would seem to be best adapted to his condition. Music, of course, opens up his most delightful field. It is said that all the force of the superintendents of the early schools was required to prevent the institutions from becoming mere conservatories of music. To-day only those pupils pursue music in regular course who have talent for it; but even those are not allowed to neglect other studies for it. It is the experience of the American schools, as of the European, that the profession of music offers to the educated and trained musician who is blind, a field in which he can work his way with least hindrance from his lack of sight, and many are they who have found in it a means of livelihood for themselves and their families. A few in nearly every school fit themselves to be tuners of pianos.

The American schools for the blind were founded upon embossed books. Dr. Howe states somewhere that the simple reading from embossed print did more to establish the schools in the country than any other one thing. Extraordinary pains were taken by Dr. Howe and his assistants to perfect a system which should be at once readily tangible to the fingers of the blind and legible to the eyes of their friends. The result was the small lower-case letter of Dr. Howe, the Boston line print, as it is often called. To this the jury gave preference before all other embossed systems exhibited at the great exhibition of the industry of all nations, in London, in 1851. Backed by such indorsement and all the authority of Dr. Howe the system was rapidly adopted into the American schools. It was then the theory that the blind would be further isolated from their friends if their alphabets were dissimilar. The blind of themselves had devised a writable system—arbitrary and composed of dots or points—one which they could both read and write. But the early superintendents would not countenance it. However, many of the blind failed to read the line-letter system; because to read it requires extreme nicety of touch, which all the blind by no means have. Characters composed of points, not of lines, are scientifically adapted to touch reading. In the 33d report of the New York institution, Supt. William B. Wait wrote: "Now, which is the more important, that all the young blind should be able to read, thus being made, in fact, like the seeing, or that they should be taught an *alphabet which in some sort resembles* that used by the seeing, but by doing which only 34 per cent of them

will ever be able to read with any pleasure or profit?" This attitude of the New York school was the outcome of statistics gathered from seven institutions, in which 664 pupils were involved, and of experiments made by Mr. Wait with his own pupils, using a system scientifically devised by him, composed of points in arbitrary combination. This was in 1868. At the next convention of the American instructors of the blind, it was resolved "That the New York horizontal point alphabet as arranged by Mr. Wait should be taught in all institutions for the education of the blind." Europe was a long time accepting a writable point system. That of Louis Braille, devised in 1829, though much used by individuals, was not officially adopted into the Paris school where it originated until 1854. In contrast, America devised, printed, spread, and resolved to accept its writable system in less than one-half the time. The benefits of a tangible writable system are vast. It puts the blind more nearly on a par with the seeing, particularly as pupils in school. Its adoption here, next to that of tangible printing, makes obtainable the ideal of American schools for the blind. Every tangible system has its defects. French "braille" as adopted into England has antiquated abbreviations and contractions for the use of adults; and is involved with rules allowing much bad use, like the omission of all capitals. The New York point as printed also laid itself open to much criticism as to "good use." The American braille, the latest system, combining the best features of French braille and of New York point, was devised by a blind teacher of the Perkins institution. It takes full account of "good use," and those who use the system deem it very satisfactory. In 1892, when the American braille system was adopted into several schools, a typewriter for writing braille was invented, and this was followed by the invention of another machine for embossing braille directly on plates of thin brass from which any number of duplicates could be struck off on paper. Here was a means of creating a new library at once. But the chief value of the invention lay in the fact that as the machine was simple and inexpensive and could be operated if necessary by a blind man, any institution could have a printing office of its own. And several schools immediately established such offices, from which they issued at once whatever their school classes demanded. By co-operating in the selection of the books to be embossed these schools have created in the space of seven years a library of books in American braille than which there is no superior in any system in any country, and they have added an immense amount of music in the braille music notation, which is the same all over the world. A typewriter, and a machine for embossing brass plates in the New York point system, have also appeared.

The Association of American instructors was formed in 1871, has met biennially ever since, usually as the guest of one or another of the institutions. The proceedings of each convention have been published. The principles underlying the scheme for educating the blind being to make them as little as possible a class apart from the rest of the community, it has not been deemed wise to attempt to establish a national college for the higher education of

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those capable of taking it, but efforts are making towards enabling the brighter and worthier pupils to attend one of the colleges for the seeing, at the expense of the states or the schools from which they come. The school instruction of the blind is comparatively an easy matter. The work is less of a science than the more difficult task of instructing the deaf and

When an exhaustive census of the graduates from all over the country was compiled, it revealed the following encouraging facts: 16 became superintendents of other institutions; 214 became teachers or were otherwise employed in institutions; 34 became ministers of the gospel; 84 authors, publishers, or lecturers; 310 were engaged as teachers of music or were vocalists outside of institutions; 69 had been organists in churches; 125 piano tuners; 937 had been engaged as teachers, employees, and workers in handicraft; 277 were storekeepers, etc.; 45 became owners and managers of real estate; 760 (mostly women) were employed at housework at home or in families, or at sewing with machines, or by hand, and 78 were in homes of employment. Further, according to the 11th census of the United States (1890) when there were 50,568 blind in the land, but 2,560 were found in almshouses. What proportion of these ever attended our schools, will never be known, but it must be remembered that blindness is an affliction of old age.

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EDWARD ELLIS ALLEN,
Principal Pennsylvania Institution for the Instruction of the Blind.

Blind Fishes. See CAVE ANIMALS.

Blind Spot. The place of entry of the optic nerve in each retina is insensitive to light. Mariotte in 1668 first demonstrated the existence of the blind spot. Its existence may be easily shown as follows: Pin a large sheet of paper against the wall so that a cross marked thereon may be at the level of the eyes; fix the position of the head by means of a headrest (a ruler about 50 centimeters in length, held by the teeth at one end, the other end resting against the paper, is a convenient headrest); with one eye closed or covered, look steadily at the cross with the other eye; move a pencil, that has been covered with paper so that the point only shows black, from the cross toward the temporal side of the field of vision; mark on the paper the position at which the pencil point disappears; move the pencil farther and mark the

position at which the point re-appears. By moving the point in various directions near this place on the paper, and marking the positions where the pencil point disappears, and re-appears, a series of marks may be made which furnish an outline figure of the form of the blind spot. The diameter of the blind spot (1.5 mm.) corresponds to a visual angle varying from 3° 39' to 9° 47'. The average is about 6°. An image of light sufficiently small thrown upon the optic nerve by means of the ophthalmoscope, gives rise to no sensations. These experiments show that at the blind spot we see nothing, yet, as we look at this page with one eye only the surface appears to be covered with letters in the regular forms; there is no blank space corresponding to the blind spot. In binocular vision the blind spot of one retina is covered with a sensitive portion of the other retina. Why we should not be aware of our inability to see a continuous field with one eye, is a problem for which there are two proposed explanations. The blind spot may be filled out by association, whose nature is determined by the character of the surrounding field, or, by eye movements which serve as retinal local signs for the insensitive region. Probably the two processes are necessary and aid each other in presenting to the mind the continuous visual field. Consult: Ladd, 'Elements of Physiological Psychology'; Helmholtz, 'Physiologische Optik' (1901); Sandford, 'Course in Experimental Psychology' ex 113, 114; Wundt, 'Physiologische Psychologie' (1893); Titchener, 'Experimental Psychology.'

Blind Tom (BETHUNE, THOMAS), a musical freak: b. about the middle of the 19th century. He was a negro slave in Georgia, and was born blind and with very weak mental development. He showed remarkable aptitude for music and after hearing a piece played once could reproduce it accurately on the piano. He also performed other musical wonders, and for several years was exhibited in various cities. His lack of intellect developed into almost brutal idiocy, and he has disappeared from the public eye.

Blindage, in operations against fortresses, the name of all preparations which tend to intercept the view of the enemy. There are several species: (1) A fascine placed across the embrasures, to prevent the enemy from observing what passes near the cannon. (2) Blinds before port-holes are shutters made of strong planks, placed before the port-holes, as soon as the guns are discharged, to obstruct the enemy's view. (3) Single and double blinds. The former consists of three strong perpendicular posts, five feet in height, between which are planks covered with iron plates on the outside, and thus made shot-proof. This screen is furnished with rollers, to enable the laborers in the trenches to push it before them. The latter consists of large wooden chests, on four block wheels, filled with earth, or bags of sand, and serve likewise in the trenches, etc., to cover the soldiers from the fire of the enemy. (4) Chandeliers used to protect the workmen in the trenches. Two square beams of timber are placed parallel, and at a distance of six feet, on the ground, and fastened by two cross beams. Upon the ends perpendicular posts are erected, and the interval is filled up with fascines, at least to a height of five feet. (5) Coverings placed over the most exposed parts in the saps or the fortress.

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These are made of beams over which hurdles or fascines are spread, that finally receive a sufficiently thick layer of earth as a covering. During the Boer war of 1899-1902 Ladysmith, Mafeking, and Kimberley were largely defended by means of bomb-proof shelters or blinds.

Blindness, inability to see, resulting from disease or injury of the external eye, of the light-receiving portions of the eye, the retina, of the nerve-conducting paths, the optic tracts, or of the light-perceiving or intellectual centres in the occipital cortex of the brain. It may be transitory or permanent, partial or complete, congenital or acquired, curable or incurable. There is a form of night-blindness, in which dim light fails to give impressions; or of day-blindness, in which excess of light is obstructive to vision. Certain regular or irregular areas on the retina may be blind; one half of one eye or of both eyes may be blind. Blindness to certain colors is a well-known form of this affection. Objects may look too small, or too large, or be distorted. See AMAUROSIS; AMBLYOPIA; EYE, DISEASES OF.

Blind, a screen of some sort to prevent too strong a light from shining in at a window, or to keep outsiders from seeing in. Venetian blinds are made of slats of wood, so connected as to overlap each other when closed, and to show a series of open spaces for the admission of light and air when in the other position.

Blindsnake, a family of small serpents (*Typhlopidae*) having worm-shaped bodies, only a few inches in length, very rigid, and suited for burrowing. These little snakes exist in all warm countries, and lead a subterranean life, worming their way through the loose top-soil, and feeding on earth-worms, grubs, and insects. Their eyes, through disuse, have become minute and weak, and in many species almost covered by overlapping plates. In India they sometimes come out upon the surface after showers, when they are regarded with superstitious dread by the natives; but they are perfectly harmless. Many species inhabit Mexico and tropical America, two or three occurring in New Mexico and Texas, where they are frequently found in ant-hills.

Blindstory. See TRIFORIUM.

Bliss, Aaron T., American politician: b. Smithfield, N. Y., 22 May 1837. He served in the Federal army during the Civil War, and was for six months a prisoner in Andersonville, Columbia, and other Southern prisons. In 1865 he settled in Saginaw, Mich., where he has been engaged in lumbering, banking, and other business enterprises. He was a member of Congress, 1889-91, was elected governor of Michigan in 1900, and re-elected 4 Nov. 1902.

Bliss, Cornelius Newton, American merchant and statesman: b. Fall River, Mass., 26 Jan. 1833. He was educated in New Orleans; entered his stepfather's counting room there; engaged in the commission business in Boston, and became head of the dry goods commission house of Bliss, Fabyan & Company, New York, in 1881. He was a member of the Pan-American Conference; chairman of the New York Republican State Committee 1877-8; and treasurer of the National Republican Committee in 1892 and 1896; declined to be a candidate for gov-

ernor of New York in 1885 and 1891; and was secretary of the interior department in President McKinley's Cabinet in 1897-8.

Bliss, Daniel, American missionary: b. Georgia, Vt., 17 Aug. 1823. He graduated at Amherst College in 1852, and at the Andover Theological Seminary in 1855; was ordained a Congregational minister 17 Oct. 1855; engaged in missionary work in Syria in 1855-62; and in 1866 became president of the Syrian Protestant College of Beyrout. His publications include: 'Mental Philosophy' and 'National Philosophy,' both in Arabic.

Bliss, Edwin Elisha, American missionary: b. Putney, Vt., 12 April 1817; d. Constantinople, 29 Dec. 1892. He graduated at Amherst College in 1837, and at Andover Theological Seminary in 1842; was ordained as a missionary in 1843, and joined the American Mission in Turkey, being stationed at Trebizond, 1843-52; Marsovan, Armenia, 1852-6; and at Constantinople after 1856. In addition to the ordinary work of a missionary he edited, 1865-92, the 'Messenger,' published at Constantinople in the Turkish and Armenian languages, and compiled a number of text-books, notably the 'Bible Handbook,' in Armenian.

Bliss, Edwin Munsell, American missionary: b. Erzerum, Turkey, 12 Sept. 1848. He was educated at Robert College, Constantinople; at the high school, Springfield, Mass., and at Amherst College, where he graduated in 1871, later taking a course at Yale Divinity School. In 1872 he was sent to Constantinople as agent for the American Bible Society, and traveled in Turkey and Persia. On his return to the United States in 1888 he edited the 'Encyclopædia of Missions.' He has also written 'The Turk in Armenia, Crete, and Greece,' and 'A Concise History of Missions.' Since 1896 he has been associate editor of the New York 'Independent.'

Bliss, Frederick Jones, American explorer (son of Daniel Bliss, q.v.): b. Mount Lebanon, Syria, 23 Jan. 1859. He graduated at Amherst College in 1880, and at the Union Theological Seminary in New York in 1887; was principal of the preparatory department of the Syrian Protestant College of Beyrout for three years; was appointed explorer to the Palestine Exploration Fund in 1890, and is best known for his excavations and finds in Jerusalem in 1894-7. Here he unearthed an ancient city wall with towers, besides streets, drains, stairways, churches, and other structures. He has published 'Mounds of Many Cities'; 'Excavations at Jerusalem,' etc.

Bliss, George, American lawyer: b. Springfield, Mass., 3 May 1830; d. near Wakefield, R. I., 2 Sept. 1897. He graduated at Harvard College in 1851; studied for two years in Berlin and Paris, and after his return read law principally at the Harvard Law School. He established himself in practice in New York. In 1859-60 he was private secretary to Gov. Morgan; in 1861 was appointed to his staff; in 1862 became paymaster-general of New York; and in that and the following year organized three regiments of United States colored infantry under instructions from the secretary of war. In 1866 he was appointed attorney for the Metropolitan boards of excise and health; in 1872, United States attorney for the Southern District of New York, and in 1881 a

BLISS — BLISTER-BEETLE

special assistant to the United States attorney-general for the prosecution of the 'Star Route' postal cases. He drafted the New York charter of 1873; drew up the New York Consolidation Act, and was author of the first tenement-house act for the city. He published three editions of the 'Law of Life Insurance' and four editions of the 'Annotated Code of Civil Procedure.'

Bliss, Philip Paul, American singing evangelist: b. Clearfield County, Pa., 9 July 1838; killed in railroad accident, Ashtabula, Ohio, 29 Dec. 1876. He received some musical instruction from G. W. Root, but was very largely self-taught. His evangelistic work was done chiefly in conjunction with Maj. D. W. Whittle and D. L. Moody, who became his warm friend and admirer. He had a fine personal presence, a gift of ready and effective speech, and these, combined with his wonderful voice, which appealed strongly to the hearts of the multitude, gave him great power over his audiences. He frequently composed both the words and music of the songs which have made his name known throughout Christendom. Of these the most popular are: "Hold the Fort, for I am Coming"; "Down Life's Dark Vale We Wander"; "Jesus Loves Me"; "Hallelujah! 'Tis Done"; and "Pull for the Shore, Sailor." His services as a revivalist were in demand throughout the United States and Canada. His songs appeared in the following named collections: 'The Charm' (1871); 'The Song Tree' (1872); 'The Joy' (1873); 'Gospel Songs' (1874).

Bliss, Porter Cornelius, American diplomatist: b. Erie County, N. Y., 28 Dec. 1838; d. New York, 2 Feb. 1885. He was educated at Hamilton and Yale colleges; became private secretary to James Watson Webb, United States minister to Brazil; explored the Gran Chaco for the Argentine government; compiled the various Indian dialects, and investigated the antiquities of that region; and in 1866 became private secretary to Charles A. Washburn, United States minister to Paraguay. He was commissioned by President Lopez to write a history of Paraguay, and while doing so war broke out between that country and Brazil, and he was imprisoned and tortured on suspicion of being a Brazilian spy. It required the presence of an American squadron to effect his release. In 1869-70 he edited the *Washington Chronicle*; in 1870-4 he was secretary of the United States legation in Mexico, and during that time made several archaeological explorations and wrote on the opportunities of American enterprise in that country. In 1874-8 he was an associate editor of 'Johnson's Universal Cyclopædia,' and in 1879 went to South America as correspondent of the *New York Herald*.

Bliss, William Dwight Porter, American clergyman: b. Constantinople, 1856. He graduated at Amherst College in 1878, and at Hartford Theological College in 1882; was ordained a Congregational clergyman; became an Episcopal priest in 1887; organized the first Christian Socialist Society in the United States in 1889, and was president of the National Reform League. He edited 'The Dawn' (1889-96); 'The American Fabian' (1895-6); and the 'Encyclopædia of Social Reform,' and published a 'Handbook of Socialism.'

Bliss, William Julian Albert, American physicist: b. Washington, D. C., 1867. He graduated at Harvard University in 1888 and pursued a course of studies in electrical engineering at Johns Hopkins, Baltimore, at which university he became successively assistant in physics (1895-8), associate (1898-1901), and professor in the latter year. He is the author of several works bearing on his profession.

Blister, a local collection of blood serum beneath the cuticle. Blisters may be produced by a variety of agents. In all instances, however, there is irritation of the part; this is followed by dilated blood vessels and an exudation of the serum from the blood vessels near the irritant. Medicinally, blistering agents or irritants may be classed in three or four groups: rubefacients (q.v.), when redness alone is produced; vesicants (q.v.), when blistering is brought about; pustulants (q.v.), when the blisters are usually small and contain pus; and escharotics (q.v.), when burning or destruction of tissue may take place. Heat is an excellent illustration. Mild heat will cause redness; temperature above 125° to 400° F. will cause blistering; temperature above 400° will burn; and high temperatures can char. The most commonly used blistering agents are heat (the hot iron being lightly touched to the skin), mustard, capsicum, mezereum, turpentine, and cantharides. The hot iron and cantharides are preferred, because their action can be controlled. Mustard mixed with cold water makes an excellent rubefacient, but it is not advised to be used as a vesicant. Blisters are used to influence deep-seated and chronic joint, muscle, and tendon troubles. For general purposes of counter-irritation (q.v.) rubefacients are more serviceable than vesicants.

Blister-beetle, or **Spanish Fly**, an oil-beetle of the family *Meloidæ*, in which there is a small head and a distinct neck; the wing-covers and sides of the body without any co-adaptation, while each claw of the feet bears a long appendage closely applied beneath it. The integument is soft, flexible, and many of the species contain a substance which forms an active vesicant, called cantharadine. The Spanish fly (*Lytta vesicatoria*) is larger than any of our native species, is of a bright shining green, and when powdered and applied to the skin raises blisters. It inhabits the south of Europe, and is usually imported from Spain. Our native blister-beetles, when dried, can also be used for producing blisters or making blister-plasters. They are black or gray, and occur on potato plants, on the flowers of the golden-rod, etc. Their transformations are wonderfully complicated, since they pass through more than one larval stage (see METAMORPHOSIS). The females lay their eggs in the earth; the young, on hatching, are of a singular primitive shape, called a "triungulin," which is very active, entering the egg-pods and devouring the eggs of locusts. It soon molts, assuming a different but still active larval stage; it molts again, entering its third larval stage, when it resembles the grub of a May beetle (scarabævid stage). In the fourth stage the grub is helpless, lying on one side; it increases rapidly in size, and when fully grown leaves the remains of the egg-pod it has been living on and forms a small cavity near by. Here it lies motionless on its side, but grad-

BLISTER-STEEL—BLOCK BOOKS

ually contracting till the skin separates and is pushed down to the end of the body, disclosing the semi-pupa or coarctate larva, which hibernates. In the spring the skin bursts and discloses a sixth larval form like the fourth. In this stage it is again active, burrowing in the earth, but taking no food, and in a few days passes into the pupa state. Other species of the family pass through a similar hypermetamorphosis.

Blister-steel. See **STEEL**.

Blithedale Romance, The, the third of Nathaniel Hawthorne's romances, published 1852. It was the outcome of an intimate acquaintance with the members of the Brook Farm Community, and immortalized the brief attempt of that little group of transcendentalists to realize equality and fraternity in labor. It is more objective and realistic than Hawthorne's other works, and therefore in a sense more ordinary. Its central figure is Zenobia, a beautiful, intellectual, passionate woman; drawn as to some outlines, perhaps, from Margaret Fuller. At the time it opens she has taken up her abode at Blithedale Farm, the counterpart of Brook Farm. The other members of the community are Hollingsworth, a self-centred philanthropist; a Yankee farmer, Silas Forster, and his wife; Miles Coverdale, the relater of the story; and Priscilla, who is Zenobia's half-sister, though of this fact Zenobia is ignorant. 'The Blithedale Romance' is a brilliant instance of Hawthorne's power as a story-teller. No scene in the whole range of fiction is more realistic than the finding of Zenobia's body in the dead of night; drawn from the dank stream, a crooked, stiff shape, and carried to the farmhouse where old women in nightcaps jabber over it. Nothing could be more in the manner of Hawthorne than his comment that if Zenobia could have foreseen her appearance after drowning, she would never have committed the act.

Blizzard, a peculiarly fierce and cold wind, accompanied by a very fine, blinding snow which suffocates as well as freezes men and animals exposed to it. The origin of the word is dubious. It came into general use in American newspapers during the bitterly cold winter of 1880-1, although some papers claim its use as early as the seventies. Such a storm comes up very suddenly and overtakes the traveler without premonition. The sky becomes darkened, and the snow is driven by a terrible wind which comes with a deafening roar. One of the most severe of these storms recorded in the West was that of January 1888 which extended from Dakota to Texas. The thermometer in some places fell from 74° to -28° F., and in Dakota to -40°. The number of deaths amounted to 235. Children were frozen on their way home from school, and farmers in their fields, and travelers were suffocated by the fine snow. The blizzard which will long be remembered in the eastern States began 11 March 1888, and raged until the 14th, New York and Philadelphia being the cities most affected. The wind at one time blew at the rate of 46 miles an hour. The streets and roads were blocked, railroad trains snowed up for days, telegraphic communication cut off, and many lives were lost.

Blizzard State, a nickname for South Dakota.

Bloat, Hoven, or Tympanites, a diseased condition of sheep or cattle, consisting of distention of the first stomach (rumen) and commonly caused by an overabundance of leguminous diet. Animals unaccustomed to graze in clover are liable to the malady, but over-eating of grain may also produce bloat. The use of cathartic remedies, such as Epsom salts or linseed oil, will often prove effective, except in severe cases. Sometimes the accumulation of gas in the rumen is so abundant and distressing that relief must be obtained by an incision made by a surgical instrument.

Bloch, Karl Heinrich, Danish painter: b. Copenhagen, 1834; d. 1890. He studied at the Copenhagen Academy and in 1852 went to Italy where he spent about 12 years. In 1883 he became a professor in the Academy in which he had been trained. Although his chief paintings are historical, he was also successful in nature-studies, and some of his pictures are notable for their humorous characteristics. Among his works are: 'Peasant's Cottage'; 'Roman Street Barber'; 'James of Scotland Visiting Tycho Brahe'; 'Christian II.'; and two frescoes in the Copenhagen University.

Bloch, Marcus Eliezer, Jewish naturalist: b. Anspach (of poor parents), 1723; d. 1799. In the 19th year of his age he understood neither German nor Latin, nor had he, with the exception of some rabbinical writings, read anything. Nevertheless he became tutor in the house of a Jewish surgeon in Hamburg. Here he learned German and Latin, and besides acquired some knowledge of anatomy. His principal work is the 'Natural History of Fishes' (folio, 1785-99), adorned with many colored plates.

Block, or Blok, Adriaen, Dutch navigator who visited Manhattan (now New York) about 1613 and again in 1614 in the *Tiger*. This ship being accidentally burned he built the *Unrest*, a craft of 16 tons, in which he coasted as far north as Nahant, discovering the Housatonic and the Connecticut rivers and the island which bears his name. See **BLOCK ISLAND**.

Block, a mechanical contrivance consisting of one or more grooved pulleys mounted in a casing or shell which is furnished with a hook, eye, or strap by which it may be attached to an object, the function of the apparatus being to transmit power or change the direction of motion by means of a rope or chain passing round the movable pulleys. Blocks are single, double, treble, or four-fold, according as the number of sheaves or pulleys is one, two, three, or four. A running block is attached to the object to be raised or moved; a standing block is fixed to some permanent support. Blocks also receive different denominations from their shape, purpose, and mode of application.

Block Books, before, and for a short time after, the invention of printing, books printed from wooden blocks, each the size of a page and having the matter to be reproduced, whether text or picture, cut in relief on the surface. These were intended for the popular use and were adorned with crude paintings, the makers of block books and card painters being the same till about the opening of the 15th century. As their work increased in favor they devised the process of block printing, cutting into

BLOCK COAL—BLOCKADE

wooden blocks or metal plates in such a manner as to leave letters and pictures in relief, and after applying color to these, taking impressions from them. One or both sides of the sheet were printed from these blocks. See also **PRINTING**.

Block Coal, the name of certain kinds of bituminous coal having a tendency to break into forms approaching the cube. See also **COAL**.

Block Island, an island in the Atlantic Ocean, midway between Montauk Point, L. I., and Point Judith, R. I.; eight miles long, and from two to five miles wide. It belongs to the State of Rhode Island, from the shore of which it is about 10 miles distant. It has become a noted summer resort, and constitutes the township of New Shoreham. Pop. (1900) 1,396.

Block Printing. See **PRINTING**.

Block System, a system of working the traffic on railroads according to which the line is divided into short sections, each section with a signal and telegraphic connection at the end. The essential principle of the system is that no train is allowed to enter upon any one section till that section is signalled wholly clear, so that between two successive trains there is not merely an interval of time, but also an interval of space.

Block Tin. See **TIN**.

Blockade is the rendering of intercourse with the seaports of an enemy unlawful on the part of neutrals, and it consists essentially in the presence of a sufficient naval force to make such intercourse difficult. It must be declared or made public, so that neutrals may have notice of it. If a blockade is instituted by a sufficient authority, and maintained by a sufficient force, a neutral is so far affected by it that an attempt to trade with the place invested subjects vessel and cargo to confiscation by the blockading power. The term is also used to describe the state of matters when hostile forces sit down around a place and keep possession of all the means of access to it, so as entirely to cut off its communication with the outside world, and so compel surrender from want of supplies.

To be sufficient, the blockade must be effective and made known. By the convention of the Baltic powers of 1780, and again in 1801, and by the ordinance of Congress of 1781, it is required that there should be a number of vessels stationed near enough to the port to make the entry apparently dangerous. The government of the United States has uniformly insisted that the blockade should be made effective by the presence of a competent force stationed and present at or near the entrance of the port. (1 Kent Com. 145.) But an accidental absence of the blockading force, or the circumstance of being blown off by the wind, if the suspension and reason of the suspension are known, will not be sufficient in law to remove a blockade. But negligence or remissness on the part of cruisers stationed to maintain the blockade may excuse persons, under certain circumstances, for violating the blockade. Taylor ('International Public Law,' p. 767), upon this subject, says:

"Under that rule the government of Great Britain naturally accepted the contention of that of the United States, made during the American Civil War,

to the effect that the legal efficiency of the blockade of Charleston, usually maintained by one ship lying off the bar between the two principal channels, with two or three others cruising outside within signalling distance,—was not destroyed by the absence of the Niagara, a blockading vessel whose withdrawal, in the attempt to intercept a cargo of arms expected at another part of the coast, left the harbor open for at least five days. It was admitted, under the British rule, that there was no cessation of the Charleston blockade, despite the fact that a large number of vessels succeeded in passing it, owing to the peculiar nature of the coast. As there is no rule requiring the blockading squadron to remain within a certain distance of the place blockaded, provided access is really interdicted, Buenos Ayres was held to have been sufficiently blockaded by vessels stationed in the vicinity of Monte Video; and, in like manner, the blockade of Riga was maintained, during the Russian war in 1854, at a distance of one hundred and twenty miles from the town by a ship in the Lyser Ort, a channel three miles wide, forming the only navigable entrance to the gulf."

When on 21 Nov. 1806, the Berlin Decree of Napoleon I. declared the whole British Islands in a state of blockade, that blockade, being ludicrously ineffective, was illegal; so also, though to a somewhat less extent, were the British Orders in Council of 11 and 21 Nov. 1807, which placed France and all its tributary states in a state of blockade. The retaliatory Napoleonic Milan Decree of 27 Dec. 1807, extending the previously announced blockade to the British dominions in all quarters, labored to a still greater extent under the same defect. More effective, as being more limited in area, were the blockades of the Elbe by Great Britain in 1803, those of the Baltic by Denmark in 1848-9 and 1864, those of the ports of the Confederate States of America by President Lincoln on 19 April 1861, and that of the Cuban ports by the United States in 1898.

To involve a neutral in the consequences of violating the blockade, it is absolutely necessary that he have due notice of it. This communication may be communicated in two ways, either actually by a formal notice from the blockading power, or constructively, by notice to his government, or by the notoriety of the fact. Formal notice is not required; any authentic information is sufficient. Phillimore, 'International Law' (page 397); Taylor, 'International Public Law' (1901, p. 768). A violation may be either by going into the place blockaded, or by coming out of it with a cargo laden after the commencement of the blockade. For a master to place himself so near a blockaded port as to be in a condition to slip in without observation is a violation of the blockade, and raises the presumption of a criminal intent. The sailing for a blockaded port, knowing it to be blockaded, is, it seems, such an act as may charge the party with a breach of the blockade. (1 Kent Com. 150; 5 Cranch, 335.) By provision in the treaties between the United States and Greece, Prussia, and Sweden and Norway, it is agreed that vessels arriving at a port supposed at the time of departure to be blockaded shall not be captured and condemned for an attempt to enter, unless on proof that they had or could have learned of the continuance of the blockade, but an attempt to re-enter after warning will subject them to condemnation. Vessels in port before the establishment of the blockade are to be permitted to depart with their cargoes. They are usually allowed from 15 to 45 days in which to make their exit. Any one running a blockade does so at his peril; his government, by international law, cannot protect him from for-

BLOCKHOUSE — BLOEMFONTEIN

feiting his vessel with its cargo, and his liberty if he be captured by the blockading fleet.

Blockhouse, in fortification, a house made of beams joined together crosswise, and often doubled, with a covering and loopholes, large enough for from 25 to 100 men. In addition to this, it is commonly covered with earth, to render it entirely bomb- and fire-proof. It is usually sunk several feet into the ground. Some forts of this kind contain two stories; and they are often fitted up to receive cannon. Blockhouses are generally built in the form of a square or a cross. Their use is to afford a feeble garrison of an important place, which is very much exposed, an opportunity of holding out against the cannonade and assault of the enemy till they are relieved. They also serve for bomb-proof guardhouses, and places of last resort, in the interior of intrenchments, and in the covered passages of fortresses, where the cannon are stationed. Blockhouses were much employed as a defense against Indians in America, by the French in Algeria, and by the Spanish in Cuba, where a line of blockhouses connected by wire barricades was built across the island in 1898.

Blocks of Five, a political expression in the United States, originating in the presidential campaign of 1888. A letter purporting to have been written by the treasurer of the Republican National Committee to the chairman of the Indiana State Committee, recommending securing "floaters in blocks of five." This was construed to mean the bribery of voters at wholesale rates. The Democratic managers circulated the letter as widely as possible, before election. Proceedings for libel were afterward begun, but never brought to trial.

Blocksborg, the name of several elevations in Germany, particularly the Brocken (q.v.), forming the summit of the Hartz Mountains and the highest point in the northern part of the empire.

Blod'get, Lorin, American physicist: b. near Jamestown, N. Y., 25 May 1823; d. Philadelphia, 24 March 1901. He was educated at Hobart College; appointed assistant professor at the Smithsonian Institution, Washington, D. C., in charge of researches on climatology, 1851; was employed on the Pacific Railroad survey for the War Department, 1852-6; and was engaged in the United States treasury department, 1863-77. He was also editor of the Philadelphia *North American*, and secretary of the board of trade of that city, 1858-64. He is credited with having laid the foundation of American climatology. His publications include 'The Climatology of the United States' (1857), a work that met high favor in the United States and Europe; 'Commercial and Financial Resources of the United States'; and about 150 volumes of reports and statistics.

Blod'gett, Henry Williams, American jurist: b. Amherst, Mass., 21 July 1821. He was educated at Amherst Academy; studied surveying and engineering; was admitted to the bar in 1844; and settled in Waukegan, Ill., to practise, in the following year. He served in the lower house of the legislature, 1852-4, and in the State Senate, 1859-65; and was United States district judge for the Northern District of Illinois, 1869-93, when he retired. He was ap-

pointed one of the counsel on the part of the United States before the arbitration tribunal on the Bering Sea fur-seal controversy between the United States and Great Britain, in 1892.

Blodgett, Samuel, American inventor: b. Woburn, Mass., 1 April 1724; d. Haverhill, Mass., 1 Sept. 1807. He took part in the French and Indian war; was a member of the expedition against Louisburg in 1745; and subsequently became a judge of the court of common pleas in Hillsboro County, N. H. He was the inventor of an apparatus by which he recovered a valuable cargo from a sunken ship near Plymouth, Mass., in 1783. His success led him to go to Europe for similar enterprises. He met with no encouragement in Spain, and in England proposed to raise the Royal George, which went down off Spithead with 800 persons on board, but his proposition was not accepted. In 1793 he began the construction of the canal around Amoskeag Falls in the Merrimac which now bears his name, but did not live to complete the work.

Bloede, blé'dè, Gertrude, American poet and novelist, better known as STUART STERNE: b. Dresden, Saxony, 10 Aug. 1845. She has written in verse 'Angelo' (new ed. 1879); 'Giorgio and Other Poems' (1881); 'Beyond the Shadow, and Other Poems' (1888); 'Piero da Castiglione'; and 'The Story of Two Lives,' a novel.

Bloemaert, bloo'märt, or Blom, Abraham, Dutch painter: b. Gorkum about 1565; d. Utrecht, 1647, or more probably 1657. His paintings are reproached with various faults, yet he is distinguished by the brilliancy of his coloring and the richness of his invention. He painted all sorts of objects, but his landscapes are the most esteemed. He had four sons, of whom Cornelis (b. Utrecht, 1603; d. Rome, 1680), was a distinguished engraver.

Bloemen, Jan Frans van, Flemish painter: b. Antwerp, 1662; d. Rome, 1748 (?). He was surnamed "Orizzonte," an allusion to the great beauty of the coloring he put into his landscapes.

Bloemen, Pieter van, Flemish painter, brother of Jan Frans: b. Antwerp, 1651; d. 1662. After study in Italy he was appointed dean of the Guild of St. Luke in his native city. His work is chiefly landscapes and military subjects. He is known as STANDAERT.

Bloemfontein, bloom'fön-tin, Orange River Colony, South Africa, the chief town and seat of government of the colony, 680 miles northeast of Cape Town, situated in an elevated and healthy region. It stands on a plain surrounded by low hills, and is regularly laid out, having a large market-square in the centre. It has several fine buildings, including the Anglican cathedral, the Dutch Reformed church, and other places of worship; the presidency; the town-hall; the post-office; the library; the national museum; the new Raadzaal, or council-chamber of the legislature; the old Raadzaal; Grey College and St. Andrew's College for boys; the Eunice Institute for girls; a government hospital and a cottage hospital; a lunatic asylum, etc. It is on the main railway line of the Colony, which is continuous with the Cape Colony and Transvaal systems. Pop. about 8,000, half being whites.

BLOIS — BLOMMAERT

In the war between Great Britain and the South African and Orange Free State republics in 1899-1900 it was the seat of important military operations. In June 1899, a conference was held here between President Kruger of the South African Republic, and Sir Alfred Milner, the British commissioner of Cape Colony, with a view of averting war. After the appointment of Lord Roberts to the supreme command of the British forces operating against the Boers, he led an expedition against the city and forced its surrender on 13 March 1900, President Steyn escaping capture. Soon afterward the part of the republic occupied by the British was formally placed under British administration.

Blois, blwä (anciently BLESUM), France, the capital of the department Loir-et-Cher, 99 miles south-southwest of Paris, situated on the right bank of the Loire, from which it rises in the form of an amphitheatre. It consists of an upper town, with very narrow and crooked streets; a lower town, with many handsome houses, extending along a handsome quay; and of several suburbs, with one of which it communicates by a stone bridge of 11 arches. The city is furnished with spring water through an old Roman aqueduct, in excellent preservation. Thierry, the historian, was born here. The castle of Blois is rich in historical associations. It was long occupied by the counts of the name, and became a favorite residence of the kings of France. Louis XII. was born, Francis I., Henry II., Charles IX., and Henry III. held their courts in it; and the Guises, by a cruel though not unjust retribution, were murdered in it. When Maria de' Medici was, in 1617, exiled from the court, she resided, probably as a prisoner, in this castle, whence, 18 months later, she escaped through a high window, which is also an object of curiosity. In 1814, on the approach of the European armies to Paris, the Empress Maria Louisa and the council of regency repaired for a while to this place. Afterward the castle was entirely neglected, and even used as barracks for cavalry. During the later years of Louis Philippe's reign, this curious specimen of architecture was carefully and tastefully restored. Blois has several literary and scientific societies, a botanical garden founded by Henry IV., a public library with 19,000 volumes, a departmental college, and a diocesan seminary. It trades in wines, spirits, vinegar, staves, and licorice, while it produces serges, hosiery and gloves, cutlery and hardware. Pop. (1896) 23,542.

Blok, Petrus Johannes, pā-troos yō-hān-ēs, Dutch historian: b. Helder, 1855. He was educated at Leyden; in 1884 became professor of history at Croningen and later at the University of Leyden. He was also Queen Wilhelmina's tutor in history. His work has been chiefly in social-political history of the Netherlands. He is the author of 'History of the People of the Netherlands' (translated into English); 'Eene Hollandsche stad in de Middeleeuwen' and 'Eene Hollandsche stad onder de Bourgondisch-Oostenrijksche Heerschappy.'

Blomfield, Charles James, English divine: b. Bury-St.-Edmunds, Suffolk, 1786; d. Ful-

ham, 5 Aug. 1857. He studied for the church at Cambridge, where he took high honors; and after filling several curacies, and acting for a time as chaplain to the bishop of London, was presented to the rectory of St. Botolph, Bishopsgate. In 1824 he was made bishop of Chester, and in 1828 bishop of London. He acquired considerable renown as a classical scholar from the editions published by him of several of the dramas of Æschylus, and he also published an edition of Callimachus, which is much esteemed. Along with Rennel, he edited, in 1812, the 'Musæ Cantabrigienses,' and in 1814, along with Monk, the 'Posthumous Tracts' of Porson, followed two years afterward by the 'Adversaria Porsoni.' In his ecclesiastical capacity he displayed great zeal and energy, more churches having been built in London under his episcopate than under that of any bishop since the Reformation. He incurred, however, some animadversions on his proceedings in relation to the Tractarian controversy by a vacillating policy, which gave satisfaction to neither of the parties.

Blomfield, Edward Valentine, English clergyman (brother of the preceding): b. 1788; d. October 1816. He studied at Caius College, Cambridge, and excited the highest expectations. Among several prizes which he gained was a medal assigned him in 1809 for his beautiful ode 'In Desiderium Porsoni.' In 1812 a fellowship in Emmanuel College was conferred on him. In 1813 he visited Germany, where he acquired a good knowledge of the German language, and became acquainted with Wolf in Berlin, and Schneider in Breslau. After his return he wrote in the 'Museum Criticum,' or 'Cambridge Classical Researches,' remarks on German literature which were received with approbation. The University of Cambridge appointed him one of the preachers of St. Mary's Church. He began a translation of Schneider's 'Griechisch-Deutsches Lexicon,' but did not live to finish it. Matthiæ's 'Griechische Grammatik,' however, he translated completely. His translation was published by his brother and was everywhere well received. He was in Switzerland in 1816 with his pupil, a young nobleman, and in his haste to return to Cambridge on hearing that he was appointed proctor for the following year, the fatigue of rapid traveling occasioned a sickness of which he died.

Blomfield, Reginald, English architect: b. 20 Dec. 1856. He was educated at Exeter College, Oxford. He is architect to the Army and Navy Society and among his many important professional works are 'Brocklesby Park,' 'Caythorpe Court,' 'Holbrook House,' 'New Buildings at Haileybury College,' 'Lady Margaret Hall,' 'Portsea Institute.' He has published 'The Formal Garden in England' (1892); 'A History of Renaissance Architecture in England' two works of great value (1897); 'Short History of Renaissance Architecture in England' (1900).

Blommaert, blöm-märt, Philip, Flemish philologist: b. Ghent about 1809. He has done much for the literature of his country

BLOMMAERT — BLOOD

by an edition of the old Flemish poets of the 11th, 12th, 13th, and 14th centuries, with glossaries, notes, and emendations. He has also republished the 'Nibelungenlied,' translated into Dutch iambics. His best work, however, is the 'Aloude geschiedenis der Belgen of Nederduitschers,' in which he vindicates the claims of his country to an independent national existence and national literature. Blommaert also writes French well, and is a contributor to the 'Messager des Sciences Historiques.'

Blommaert, Samuel, Colonial patroon: b. 1590; d. 1670. He bought a tract of land almost equal in size to the present State of Delaware, extending from Cape Henlopen to the mouth of the Delaware River. The deed for this land given him by Peter Minuit, and his Council is the oldest deed for land in Delaware. He formed a company to provide for the settlement of this land, and a colony was started, but destroyed by the Indians after a few years in revenge for an act of the governor, Gillis Hosset.

Blond, Jacques Christophe le, zhāk kris-tof lē blondt, printer of engravings: b. Frankfort-on-the-Main, 1670; d. Paris, 1741. He was bred a painter, and in 1711 went to Amsterdam, and some years after to England. He conceived the idea of an establishment to print engravings in colors, and, obtaining means, produced many copies of engravings and pictures, which of course had defects, and the experiment failed. He now devoted himself to producing the cartoons of Raphael in tapestry, but this failed also, and he soon after died.

Blon'del, a confidential servant and instructor in music of Richard Cœur de Lion of England, about the year 1190. While his master was the prisoner of the Duke of Austria, Blondel went through Palestine and all parts of Germany in search of him. He understood, it is said, that a prisoner of rank was confined in Lowenstein Castle, and hastened hither. Placing himself under a grated tower, he began to sing one of the French lays which he had formerly composed for Richard. Scarcely had he finished the first stanza when a voice from the dungeon of the tower responded. Thus he discovered his king, delivered him, and gained the name of the "faithful Blondel." Grétry's fine opera, 'Richard Cœur de Lion,' is founded on this anecdote.

Blondin, Charles Emile Gravelet, shāri ā-mēl grāv-lā blōn-dān, French acrobat: b. St. Omer, Pas-de-Calais, 1824; d. London, 22 Feb. 1897. He was trained at Lyons, where he made such rapid progress that he was designated 'The Little Wonder.' After making a several years' tour of the United States, on 30 June 1859, before a crowd of 25,000 persons, he crossed the Falls of Niagara on a tight-rope in five minutes; on 4 July he crossed blindfold, trundling a wheelbarrow; on 19 August he carried a man on his back; on 14 Sept. 1860 he crossed on stilts in the presence of the Prince of Wales. His engagement at the Crystal Palace in 1862, where he performed on a rope 249 yards long, and 170 feet from the ground, drew immense

crowds. After several years' retirement he reappeared in 1880, and in 1888 again performed in London, where he died.

Blood, Thomas (commonly called COLONEL BLOOD): b. Ireland, 1618; d. 1680; was a disbanded officer of Oliver Cromwell, and a man distinguished in various audacious enterprises. He made an attempt to steal the crown and regalia from the tower, in which he almost succeeded. Being, however, taken, he confessed his purpose without showing the least fear of death. Charles II. from idle curiosity, went to see him, and Blood persuaded the monarch to pardon him. Charles even bestowed an estate with \$2,500 a year upon him, while poor Edwards, the keeper of the jewel-office, who valiantly defended the crown and was wounded, lived forgotten.

Blood, the yellowish to reddish liquid alkaline medium present in the arteries and veins, the chief tissue of oxidation in the animal body. The composition and character of the blood varies very widely in different animals, and hence this description is confined more particularly to the human blood. From the standpoint of cell-structure the blood is a tissue made up of a liquid plasma and solid cells or corpuscles. It contains at least four separate and important ingredients, the plasma, or blood serum; red cells, or erythrocytes; white cells, or leucocytes; and blood plates. About one tenth to one twelfth of the entire body is blood, of which nine tenths is water.

Plasma.—The greater portion (56 per cent) of the blood is plasma. This plasma is composed of 90 per cent water containing gases, mineral salts, fats, nitrogenous bodies, and carbohydrates in solution. It is a clear yellowish fluid. The mineral salts are sodium chloride, common salt, the most abundant; sodium carbonate, which renders the blood alkaline; potassium chloride, potassium sulphate, calcium phosphate, sodium phosphate, magnesium phosphate, and calcium chloride. Traces of other inorganic salts are frequently found. The gases in the blood plasma are oxygen, nitrogen, and carbon dioxide. Of the organic constituents the non-nitrogenous ones are the fats and carbohydrates, with small amounts of fatty coloring matters, lipochromes, cholesterol, and sarcocollactic acid. The fats are present in variable quantities, being particularly abundant following a meal. They are the glycerides of stearic, oleic, and palmitic acids. The carbohydrates are at least three, glycogen, dextrose or grape sugar, and animal gums. The non-proteid nitrogenous constituents of the plasma consist largely of the waste extractives. The most important of these are urea, kreatin, kreatinin, uric acid, and hippuric acid. Three ferments or enzymes are thought to be present in the plasma—a diastatic ferment, converting starches into sugars; a glycolytic enzyme, breaking up sugar, and a lipase, or fat-splitting enzyme. In addition, there is the ferment that causes coagulation. Whether this is present in the serum or in the white cells is a matter of inquiry. The proteids of the plasma are serum albumins, globulins (serum globulin and fibrinogen), and nucleo-proteids.

BLOOD—BLOOD FEUD

Red Cells.—These are the most abundant of the formed elements of the blood, making up 99 per cent of the corpuscles. There are thought to be in man at least 5,000,000 red blood-cells to every cubic millimetre of blood; their size, therefore, is very small, averaging in man 7.8 m.m. They are flattened circular disks, with double depressed centres, one fourth as thick as broad. In the embryo and in certain diseased states the red blood-cells have a nucleus, but the normal red blood-cell in man has lost this cell-structure. Practically all of the mammals, save the camel tribe, have circular red blood-cells; the camels and most of the lower animals have oval red blood-cells; in the lower animals they are mostly nucleated. There is also great variation in size in the red cells of the various animals, being largest among the *amphibia* (*Amphiuma* 75 m.m.). The red blood-cells are mostly manufactured in the marrow of the long bones. The chemical structure of the red cells is complex, but they contain an iron compound, hemoglobin, which is the most important constituent of the blood in the process of respiration and oxidation; by it the complex processes of chemical interchange in the body (metabolism) are made possible. Poisoning of the hemoglobin and the loss of its function means death by asphyxia. The hemoglobin gives the reddish-yellow tinge to the blood, and the differences in shade between venous blood and arterial blood are due to the state of oxidation of the hemoglobin.

White Cells—Leucocytes.—These are much less numerous than the red cells, varying in number from 5,000 to 20,000 to the cubic millimetre. At least five different forms of white cells are normally present in human blood. These are large and small lymphocytes, polymorpho-nuclear neutrophiles, eosinophiles, and transitional forms. Mast cells are another form of varying occurrence. The polymorph neutrophiles are the most numerous of the leucocytes and make up the greater mass in pus-cells. In shape and size these white cells differ, but all are spherical, some smaller than the red cells (6.7 m.m.), but mostly larger (about 10 m.m.), and all have one or more nuclei. The leucocytes are formed in a number of lymphatic tissues, the hæmolymp glands, the spleen, etc., and are among the most interesting of the constituents of the blood, since one of their chief functions is to protect the body from disease-producing micro-organisms. They may be aptly termed the human body's "army of the interior" in the fight with disease-causing agents. They are useful both physically (by eating, as it were, the bodies of invading bacteria—phagocytosis, q.v.) or chemically (in the elaborating of certain counter-poisons—antitoxins, q.v.), or in the manufacture of specific immunizing bodies for the blood-serum (see IMMUNITY). Their careful study in diseased conditions is very helpful in arriving at a diagnosis of the disease process.

Blood Plates.—These are of frequent occurrence, but as yet little is known of their function. They are thought to be globulin-like in their nature, and of use in the phenomenon of coagulation; others claim them

as nucleo-proteids, made from the white blood-cells.

Functions of the Blood.—These, as already indicated, are numerous. Through the hæmoglobin, blood is the great oxidizing medium. It carries products for anabolism and products of katabolism, and is the great equalizer, by arterial pressure, of the osmotic pressures of all the cells of the body. As a means of defense in the struggle with parasitic invaders the blood is the most important of the body's bulwarks. See BLOOD DISEASES.

(Consult Ewing, 'Clinical Pathology of the Blood' (1902), with a most exhaustive bibliography on all blood subjects. For physiology see Schäfer, 'Physiology,' Vol. 1, 1898.)

Blood, Avenger of, in Scripture, the nearest relation of any one that had died by manslaughter or murder, so called because it fell to him to punish the person who was guilty of the deed. In the political law of Israel the practice of punishment by the nearest relative, which had always been prevalent, was allowed to continue, while rules were laid down to prevent the chief abuses connected with it. The distinction was sharply drawn between murder and manslaughter. For the former no ransom or satisfaction was permitted. In the case of the latter, however, there were six cities set apart out of the number which the Levites occupied, placed at suitable distances over the extent of the land, three on each side of the Jordan, with roads leading to them which were well kept up, and these were cities of refuge to which the manslayer might flee, and within which he might dwell in safety without fear of the avenger. But he was not permitted to return to his own place; in fact, he had no safety, if he left his place of refuge, until the death of the high-priest during whose term of office his misfortune had occurred. See CITIES OF REFUGE.

Blood Clam, or Blood Quohog, a local name given in Narragansett Bay to *Arca* or *Scapharca transversa*, a common bivalve ranging from Narragansett Bay to Georgia, in reference to the reddish spots on the inside of the edge of the shell, and to the reddish flesh-color of the ovaries. It is not used as an article of food.

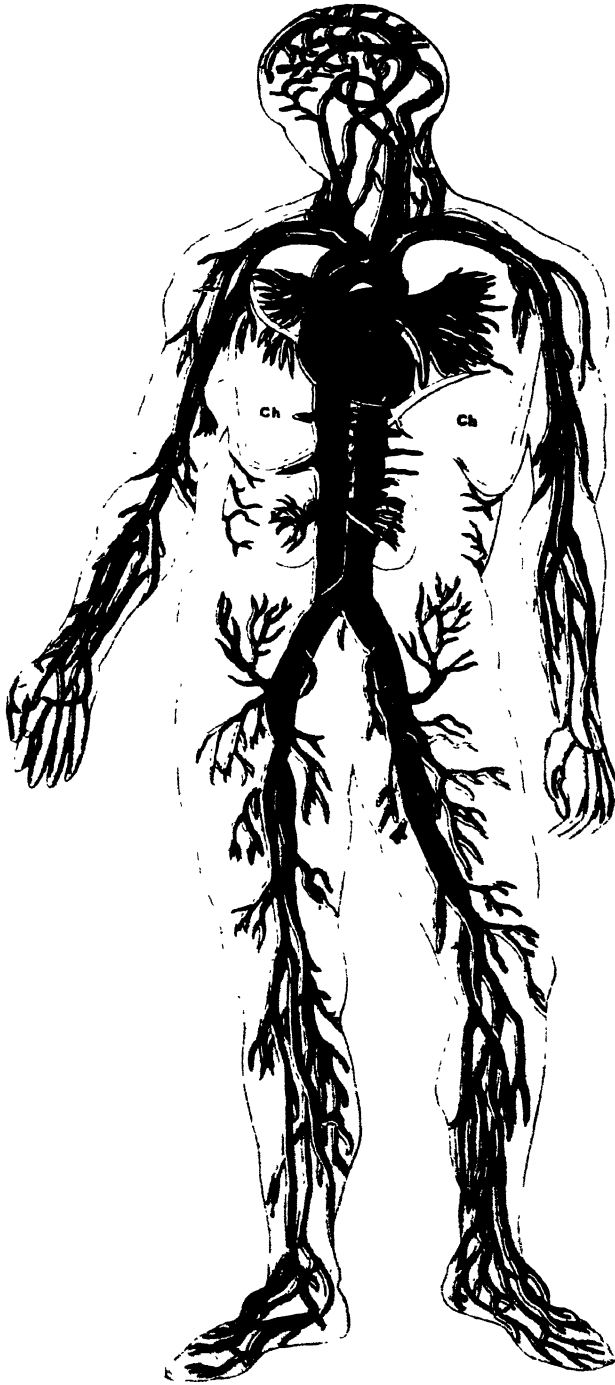
Blood, Council of, the name popularly applied to the Council of Troubles, established by the Duke of Alva, in the Netherlands, in 1567. Although it had no charter or authority from any source, it was omnipotent and superseded all other authorities. In the first three months alone its victims numbered 1,800, and soon there was hardly a Protestant house in the Netherlands that had not furnished a victim.

Blood Diseases. See ANÆMIA; BLEEDING; CHLOROSIS; CIRCULATION; HÆMOLYTICS; HÆMOPHILIA; LEUCÆMIA; LEUCOCYTOSIS; LEUCOPENIA; PERNICIOUS ANÆMIA; PSEUDOLEUCÆMIA.

Blood Feud, the right of individual, or family, vengeance in cases of bloodshed. In a very primitive state of society the tendency toward private instrumentality in the punishment of crime is largely unchecked. In passing from this stage to the highly organized system of legal penalties enforced by modern

BLOOD.—THE GENERAL DISTRIBUTION OF THE BLOOD VESSELS.

Arteries are shown in red the veins in blue.



H, the heart. l, left side r, right side. Arising from the heart is the main artery Aorta (A). The letter is put on the vessel at some distance from the heart, near where it gives off the branches in red for the head and arms, and at the point where it arches backwards and downwards to pass through the chest and the belly till at A. It gives off branches for the legs. Running alongside the arteries are represented in blue, veins At K, is represented the position of the kidneys and their veins. L, represents veins of the lung J, jugular vein. Ch

civilized governments, the regulation of the blood feud was a marked step in the advancement of the race. It is true that the right of private vengeance was recognized, but it was put under restrictions and gradually narrowed in its action. The slayer had the right of sanctuary, illustrated by the cities of refuge in Israel under the Mosaic economy, by the altars of pagan deities and by the churches of the Middle Ages. The danger of dragging entire clans into retributive warfare to avenge a single murder was averted by limiting the right of vengeance to the immediate family, or the next of kin to the one slain, and the privilege of purchasing exemption by the wergild tended to check a blood penalty. The acceptance of the blood-money was finally made obligatory. The amount of the fine imposed upon the murderer varied among the Anglo-Saxons according to the rank of the victim. The family feuds among the mountain whites in certain sections of the United States form an interesting modern instance of the survival of the primitive institution of blood feud. See ASYLUM, RIGHT OF.

Blood-flower, or **Blood-lily**, a genus (*Hemantthus*) of about 60 species of summer- and autumn-blooming bulbous-rooted plants of the natural order *Amaryllidaceæ*, natives mostly of South Africa, named from the general color of their flowers, which are arranged in umbels arising on an often beautifully colored scape either before the foliage or from a rosette of radical leaves. The few species cultivated in American greenhouses have not become widely popular, but are worthy of more extended culture, since the individual flowers are often two inches in diameter and the umbel sometimes a foot across. They may be cultivated like the nerine. Since some of the most attractive species reproduce slowly, the bulbs are often cut in two horizontally and treated like hyacinth bulbs similarly cut. Several new bulbs form around the margin of the cut halves. Consult Bailey and Miller, 'Cyclopedia of American Horticulture' (1900-2).

Blood Indians, or **Kino Indians**, a tribe of North American Indians of the Siksika Confederacy, dwelling in the Northwest Territories of Canada.

Blood-letting. See BLEEDING.

Blood-lily. See BLOOD-FLOWER.

Blood-money, money paid to the next of kin of a man who met with his death at the hands of another, accidentally or with premeditation. The Greeks called it *πρωμή*, the Latins *pana*, the Franks, Allemanni, and Scandinavians *manbotc*, *wehrgeld*, or *wyrgilt*, the British Celts named it *saarhard*, and the Irish Celts *eric*. The institution still flourishes in many communities of Asia and Africa. In English criminal law the term blood-money was also applied to rewards paid to informers against highway robbers, thieves, burglars, and utterers of false coin or forged bank-notes. Laws empowering such payments were passed between 1692 and 1742. In 1813 the total amount paid in this way was £18,000. By this time a number of persons made a living out of these laws by entrapping unwary and foolish people into the commission of the

crime of forging or uttering false coin, and then informing against them. As early as 1756 one McDaniel had brought to the scaffold and earned the blood-money of no less than 70 victims. Parliament, recognizing the abuses the system had engendered, repealed all the laws relating thereto, except in relation to the forgers of bank-bills, in which case the informer can still get his pecuniary reward.

Blood-pheasant, one of the small quail-like pheasants of the Himalayan genus *Ithagenes*, whose throat and breast are blood-red.

Blood-poisoning. From the standpoint of bacteriology blood-poisoning may be of two distinct types: It may be due to the presence of the poisonous toxins taken up by the blood, in which case it is called bacteriæmia or sapræmia, sometimes septicæmia; or it may result from the toxins plus the micro-organisms in the blood itself, a true blood infection, in which case it is termed, septicæmia, or pyæmia. The bacteria most frequently found in the blood in cases of septicæmia or pyæmia are the *Streptococcus pyogenes aureus*, *Staphylococcus pyogenes aureus*, *Diplococcus lanceolatus*, in pneumonia, *Bacillus typhosus*, in typhoid, and occasionally others. See PYÆMIA; SAPRÆMIA; SEPTICÆMIA.

Blood Pressure. The muscular contractions of the heart and the elasticity of the blood vessels maintain throughout the arterial system a normal grade of pressure of the blood. This is measured in a general way by feeling the pulse and judging of the pressure by the resistance of the artery to the fingers. More accurate means have been devised to show both the maximal and the minimal blood pressure in the arteries. Among these are Gaertner's tonometer, Oliver's and the Riva Rocci instruments. During health there is a variable constant of blood pressure, but in diseased conditions there may be marked variations from the normal. Heightened blood pressure seems less immediately prejudicial to the life activities, whereas a marked fall in the blood pressure is a precursor of death. See CIRCULATION (*Physiology of*).

Blood-rain, showers of grayish and reddish dust mingled with rain, which occasionally fall, usually in the zone of the earth which extends on both sides of the Mediterranean westwardly over the Atlantic and eastwardly to Central Asia. The dust is largely made up of microscopic organisms, especially the shells of diatoms, the red color being due to the presence of a red oxide of iron.

Rains of this character occur in tropical countries where violent hurricanes following periods of drought carry the dust from dried lake-bottoms and river-beds into the upper regions of the atmosphere. Sometimes the dust is transported several hundred miles before it is brought down by rain, and may even reach the higher latitudes and be precipitated with snow.

Blood-serum, a clear, amber-colored fluid squeezed out by contraction from a coagulating mass of blood-cells; blood-plasma. See also BLOOD.

BLOOD-STAINS — BLOODY SHIRT

Blood-stains, in medico-legal investigations, are subjects of some importance, particularly when murder is suspected and so-called blood-stains are to be investigated. The first question to be determined is whether the suspected stain is blood of any animal; secondly, is it human blood or that of a lower animal. To determine the first question certain tests have been devised. These are (1) the guaiac test, by which blood brought in contact with tincture of guaiac and hydrogen peroxide develops a blue color (not, however, conclusive); (2) the hæmin test, by which crystals are produced from the hæmoglobin and identified under the microscope; (3) the spectroscopic test, which gives a spectrum of hæmoglobin; (4) the microscope test, by which the blood-corpuscles are identified. To answer the second question requires either (1) the microscopical examination that determines the size, shape, and qualities of the blood-corpuscles; or (2) a much more reliable serum test, by which human serum, if brought in contact with the blood of an alien animal, causes dissolution of the blood-corpuscles of that animal's blood. By this serum test it is possible to detect any blood of any animal.

Blood-transfusion. See INFUSION; TRANSFUSION.

Blood-vessels. See ARTERIES; CAPILLARIES; HEART-VEINS.

Blood of Our Saviour, an order of knighthood, known also as the Order of Our Redeemer, and the Precious Blood of Jesus Christ. It was instituted in Mantua, Italy, in 1608, by Duke Vincenzo Gonzaga, and consisted of 20 members. Upon the collar was the legend *Domine probasti me*, and on the pendant, *Nihil isto triste recepto*.

Bloodbird, a black honey-eater of southern Australia, whose head, neck, breast, and back (of the male) are scarlet red.

Bloodhound, a dog of the "hound" build, commonly used for tracking fugitives. It usually stands from 25 to 27 inches high at the shoulders and weighs about 90 pounds. In appearance it is of a sedately noble expression, with a wise-looking, wrinkled face. Its color is black, mingled with a rich tan on the legs; a few are all tan. Its coat is short and glossy; the ears large and pendant; and the eyes deeply sunken, and showing a third lid or "haw." It has a somewhat loose skin for so muscular a dog, and quite a dewlap in front of the throat. It has a wonderful power of scent, by means of which, aided by judicious training, it is enabled to follow the footsteps of a particular man, though they may be crossed and recrossed a thousand times by other footsteps, and though they lead over bare pavements.

The true bloodhound suffers from an unfortunate name, which seems to suggest bloodthirstiness, a quality very far removed from his real disposition. The term "bloodhound" originally meant simply that the dog was thoroughbred in the same sense that a horse or other animal is of "blood" or "blooded" stock. In the early days the Spaniards introduced into Cuba and South America dogs which had some of the character-

istics of the bloodhound, but were really a cross between the ferocious war-dog of the ancients and the big Spanish pointer. These dogs had evil dispositions and were capable of great ferocity, and their sins have been visited on the real but innocent bloodhound. The true bloodhound will trail a man to the last of its strength, but will not voluntarily attack him. When it has located him, it will keep guard and prevent his escape; and may, if attacked, use its great powers in self-defense, but it is not in its nature to be cruel.

Bloodroot. See SANGUINARIA.

Bloodstone. See HELIOTROPE; HEMATITE.

Bloodwood. See JARROL.

Bloodworm, the larvæ of species of *Chironomus*, gnats allied to the mosquito. The worms live in fresh-water pools and sluggish streams. They are long, slender, and worm-like, and certain species are blood-red in color. The flies have very feathery antennæ and do not bite. The larvæ usually have no tracheæ. The red color of these larvæ is due to hæmoglobin, a substance that has the power of attracting and storing oxygen, and giving it off to the tissues as they require it. Such larvæ are able to live in burrows which they construct in the mud. Some of them, provided plentifully with hæmoglobin, are in consequence able to live at great depths (it is said even at 1,000 feet in Lake Superior), and come to the surface only occasionally. A few are able even to tolerate salt water, and have been fished up from considerable depths in the sea. It is a remarkable fact that these physiological capacities differ greatly within the limits of the one genus, *Chironomus*, for some of these species are destitute of hæmoglobin, and have to live near the surface of the water; in these there is a well-developed tracheal system.

Bloodwort. See SANGUINARIA.

Bloody Assizes, the name given by the people to a series of trials held in England by the infamous Judge Jeffreys, in 1685, after the suppression of the Duke of Monmouth's rebellion. Upward of 300 persons were executed after short trials; very many were whipped, imprisoned, and fined; and nearly 1,000 were sent as slaves to the American plantations. See JEFFREYS, GEORGE.

Bloody Bill, in American politics, an act sometimes called the FORCE BILL, passed by Congress 2 March 1833. Its aim was to enforce the tariff-law of 1832, which the legislature of South Carolina had declared null and void.

Bloody Falls, the lowest cataract of the Coppermine River in the Northwest Territories of Canada; so named because of a massacre here of Eskimos by Chippewa Indians in 1770.

Bloody Mary, a popular designation of Mary, Queen of England, on account of the persecutions of the Protestants during her reign (1553-8).

Bloody Shirt, a term used about 1880 in Congress, to revive the memories of the Civil War by impassioned allusions as, "to wave the bloody shirt."

BLOODY TOWER—BLOOMFIELD-ZEISLER

Bloody Tower, a term popularly applied to that portion of the Tower of London in which Richard III. is alleged to have caused the murder of his nephews, Edward V. and the Duke of York.

Bloom, the powdery or waxy protective film upon fruits, as grape and plum; and upon leaves and stems, as cabbage. It is especially noticeable upon desert plants. See also XEROPHYTES.

Bloom, a lump of puddled iron, which leaves the furnace in a rough state, to be subsequently rolled into bars or other form into which it may be desired to convert the metal. Also a lump of iron made directly from the ore by a furnace called a bloomery. See also IRON.

Bloomer, Amelia Jenks, American reformer; b. Homer, N. Y., 27 May 1818; d. Council Bluffs, 30 Dec. 1894. She was married in 1840 to Dexter C. Bloomer, of Seneca Falls, N. Y., where for several years she and her husband were engaged in publishing a semi-monthly periodical. In 1849 she began publishing 'The Lily' in the interests of temperance reform and women's rights; in 1853, on removing to Mount Vernon, Ohio, she resumed its publication there, and also became associate editor of 'The Western Home Journal.' In 1855 the couple removed to Council Bluffs, Iowa, where Mr. Bloomer became an organizer of the Republican party in that State, and a Federal official and a judge. She carried on her reformatory work for many years. Mrs. Bloomer will be remembered longest because of her personal adoption and her active advocacy of a costume which had been devised by Mrs. Elizabeth Smith Miller, and which became more popularly known as the Bloomer costume. (q.v.)

Bloomer Costume, a style of dress introduced about the year 1849 by Mrs. Amelia Jenks Bloomer (q.v.), who proposed thereby to effect a complete revolution in female dress and add materially to the health and comfort of her sex. It consisted of a jacket with close sleeves, a skirt reaching a little below the knee, and a pair of Turkish pantaloons secured by bands around the ankles. Though adopted rather extensively in America, it was unable to hold its ground against the united strength of prejudice and ridicule, and abroad it scarcely made further way than furnishing a favorite subject of burlesque on the stage, and of ridicule in the pages of the comic papers. One or two "strong-minded" women who ventured to brave public opinion in London by donning the new costume, were persecuted by the mob.

Bloomfield, Joseph, American soldier: b. Woodbridge, N. J.; d. Burlington, N. Y., 3 Oct. 1823. When the Revolutionary War broke out he was studying law, but joined the cause of the colonists with enthusiasm. In 1776 he received a captain's commission in the 3d New Jersey regiment, served with distinction throughout the war, and was mustered out a major. Resuming his legal studies, he acquired a successful practice in Burlington, was elected attorney-general, and twice (1801, 1812) governor of the State. During the War of 1812 he commanded a brigade. From 1817 to 1821 he was a representa-

tive in Congress, and as chairman of the Committee on Revolutionary Pensions he reported the bill granting pensions to soldiers of the Revolutionary army. In 1793 he was appointed a trustee of Princeton, and during his eight years' membership of the board, did much to promote the interests of that college.

Bloomfield, Maurice, American educator: b. Bielitz, Austria, 23 Feb. 1855. He came to the United States in 1857; entered the University of Chicago, and was graduated at Furman University, in Greenville, S. C., in 1877; took a course in Sanskrit and comparative philology in Yale College 1877-8; and was a Fellow of Johns Hopkins University 1878-9. He continued his studies in Berlin and Leipsic 1879-81; became an associate in Johns Hopkins University in 1881; and subsequently professor of Sanskrit and comparative philology there. He published numerous grammatical and philological papers; edited for the first time from the original Sanskrit MSS. the 'Sutra of Kauçika'; translated the 'Atharva-Veda' in the 'Sacred Books of the East'; and has since been engaged in compiling a 'Concordance of the Vedas.'

Bloomfield, Robert, English poet: b. Honington, 1766; d. August 1823. He learned to read at the village school, and in 1781 was sent to learn the trade of a shoemaker with his brother in London. The visiting of several places of worship, a debating society, Covent Garden Theatre, and the reading of sundry books, called forth his faculties, and he became almost unconsciously a poet. Hearing him one day repeat a song which he had composed, his astonished brother prevailed on him to offer it to the 'London Magazine,' and it was accepted. The piece was called 'The Milkmaid.' A second, 'The Sailor's Return,' likewise found a place in that journal. Thomson's 'Seasons,' 'Paradise Lost,' and other works of this kind, now became the subjects of his constant study. In the country, where he resided for a short time in 1786, he first conceived the idea of his poem, 'The Farmer's Boy,' which is characterized by a spirit of rural simplicity and innocence. It was written under the most unfavorable circumstances, in a garret. It was first shown to Capel Lofft in 1798, who was so much pleased with it that, in conjunction with his friend Hill, he had it printed in 1800. Bloomfield was patronized by the Duke of Grafton, who bestowed on him a small annuity and made him an under-sealer in the seal-office. This situation he was forced to resign on account of ill health. He then worked again at his trade as a shoemaker, and employed himself in constructing Æolian harps. Engaging in the book trade he became a bankrupt, and in the latter part of his life was afflicted with violent headaches and became nearly blind. He was gradually reduced to such a state of nervous irritability that apprehensions were entertained of his becoming insane. These fears were terminated by his death.

Bloomfield-Zeisler, Fanny, American pianist: b. Bielitz, Austrian Silesia, 16 July 1866. She came to Chicago with her parents in her second year, and at an early age displayed marked musical talent, which was later developed by study abroad, chiefly under Leschetizky at Vienna. Since 1895 she has played regularly in the principal cities of the United States. In

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1893-5 she made a tour of the chief cities in Germany, everywhere meeting with great applause. In the spring of 1898 she made a successful English tour.

Bloomfield, N. J., a township in Essex County, on the Delaware, L. & W., and the Erie R.R.'s, the Morris Canal, and trolley lines connecting with Newark, the Oranges, Jersey City, and other cities; 10 miles northwest of New York. It was founded in 1685, under the name of Watsessing, and received its present name from Gen. Joseph Bloomfield in 1796. The oldest church in the town dates from this year. Bloomfield once ranked as an educational centre. Here were located in addition to other similar institutions, the Bloomfield Classical School, Madame Cooke's Female Seminary, and a Presbyterian Theological Seminary, the edifice of the latter being now occupied by a German theological seminary. It has a fine Mountainside Hospital; contains the residences of many New York business men; and is engaged in the manufacture of church and cabinet organs, woolen goods, hats, shoes, rubber goods, tissue and photographic paper, saddlery, hardware, electric elevators, and a variety of brass goods. It has a national bank, daily and weekly newspapers, an assessed property valuation of nearly \$4,000,000, and a total debt of about \$250,000. Pop. (1900) 9,668.

Bloomington, Ill., city and county-seat of McLean County; on several important railroads; 60 miles north-northeast of Springfield. It is the seat of the Illinois Wesleyan University (Methodist Episcopal), a Roman Catholic college, two hospitals, three sanitariums, and the general offices of the Chicago & A. R.R. The Illinois State Normal University and the State Soldiers' Orphans' Home are located at Normal, two miles from the city. Bloomington has electric light and street railway plants, waterworks supplied from an artesian well, public library, three national banks, railroad shops, and manufacturing of machinery, stoves, farming implements, patent medicines, brick and tile, etc. Pop. (1900) 23,286.

Bloomington, Ind., city and county-seat of Monroe County, on the Louisville, N. A. & C. R.R.; 60 miles south-southwest of Cincinnati. It is in a limestone and quarry region; is the seat of the Indiana State University; and besides its farming and quarrying interests has important manufacturing concerns, especially in the lines of leather and hardware. The city has the Monroe County Library, a national bank, several daily and weekly periodicals, and a property valuation of over \$1,500,000. Pop. (1900) 6,460.

Bloomsburg, Pa., a town and county-seat of Columbia County; on the Susquehanna River, the Pennsylvania Canal, and several railroads; 40 miles west of Wilkesbarre. It is in an iron and limestone region; contains a number of iron furnaces and foundries, silk mills, brass and copper tube works, furniture and desk factories, carpet factories, etc.; is the seat of the State Normal School and a literary institute, and has an assessed property valuation of about \$2,500,000. Pop. (1900) 6,170.

Blot in the Scutcheon, A, a tragedy by Robert Browning, written in 1843, and acted at Drury Lane Theatre, in that year. In the United States it was played by Lawrence Barrett.

Blouet, Paul, pōl bloo-ā (MAX O'RELL), French lecturer and author: b. Brittany, France, 2 March 1848; d. Paris, 24 May 1903. In early life he was an officer in the French army, but in 1873 went to England and became a teacher. After the publication of his first book, 'John Bull and His Island' (1883), he abandoned teaching and devoted himself to literature. He has made several lecturing tours of the United States. His works include: 'John Bull and His Daughters' (1884); 'Jonathan and His Continent' (1888, with Jack Allyn); 'A Frenchman in America' (1891); 'John Bull & Co.' (1894).

Bloundelle-Burton, John Edward, English novelist: b. 3 March 1850. He was educated for the army, has lived and traveled in the United States and many European countries and has been a correspondent of various English and French journals. His published works include: 'The Silent Shore' (1886); 'His Own Enemy' (1887); 'The Desert Ship' (1890); 'The Hispaniola Plate' (1894); 'A Gentleman Adventurer' (1895); 'In the Day of Adversity' (1896); 'Denounced' (1897); 'The Clash of Arms' (1897); 'Across the Salt Seas' (1898); 'The Scourge of God' (1898); 'Fortune's My Foe' (1899); 'A Bitter Heritage' (1899); 'The Seafarers' (1901); 'Servants of Sin' (1900); 'A Vanished Rival' (1901); 'The Year One' (1901); 'The Fate of Valsec' (1902).

Blount, blünt, Charles, English deist (son of Sir Henry Blount, q.v.): b. London, 27 April, 1654; d. 1693. He became noted for his contributions (often but flippant) to the political, literary, and theological controversies of the times, some of his works being 'Anima Mundi'; a translation of the first two books of 'Apollonius Tyanæus'; 'Great is Diana of the Ephesians'; 'Janua Scientiarum'; and 'Vindication of Learning.' His miscellaneous works, with preface by Gildon, appeared in 1695. Despairing of marriage with his deceased wife's sister, he died by his own hand.

Blount, Sir Henry: b. Tittenhanger, Hertfordshire, in 1602; d. 1682. He studied at Oxford, became a lawyer, traveled through various parts of the south of Europe and Egypt, and published an account of his travels, which, though not distinguished by accuracy, were interesting, and passed through at least eight editions. He was knighted by Charles I., and during the Civil War took part with the royalists. He was present at the battle of Edgehill, and is said to have been entrusted with the young princes. After the king's death he came to London and was employed by Cromwell and the Parliament in several important affairs. His infidel tendencies became more fully developed in his son Charles (q.v.).

Blount, James H., American legislator: b. Macon, Ga., 12 Sept. 1837; d. 8 March, 1903. He first came into public notice in 1865, when, after having served in the Confederate army he was a delegate to the Georgia constitutional convention. Thereafter he devoted himself to the practice of law until 1872, when he was elected to Congress from the Sixth District of Georgia. He held his seat by successive re-elections till 1893, when he declined a further term. As he finished his last term the House paid him the unusual honor of suspending its proceedings to give the members an opportunity to testify to

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their appreciation of his worth. In his last term he was chairman of the Committee on Foreign Affairs, and his familiarity with American relations with other countries led President Cleveland to appoint him commissioner paramount to Hawaii in March, 1893, for the purpose of investigating the deposition of the royal government and the establishment of the American protectorate over the kingdom. On his arrival in Honolulu he at once caused the American flag to be hauled down from the Provisional Government House, and the United States marines to be withdrawn from the locality. This proceeding led to considerable excitement in the United States; the withdrawal of United States Minister Stevens from Honolulu; the appointment of Commissioner Blount as his successor; and a renewal both in Washington and Honolulu of the agitation for the annexation of Hawaii to the United States. On the completion of his mission Minister Blount retired to his large Georgia estates. See HAWAII.

Blount, William, American statesman: b. North Carolina, 1754; d. Knoxville, Tenn., 21 March, 1810. He was a delegate from his native State to the Continental Congress in 1782, 1783, 1786, and 1787; a signer of the Federal Constitution in 1787, and governor of the territory south of the Ohio (1790). In 1796 he was chosen president of the Convention of Tennessee, and was elected the same year by that State to a seat in the U. S. Senate. But in 1797 he was expelled from that body for having, as it was alleged, instigated the Creeks and Cherokees to assist the British in conquering the Spanish territories near the United States. His impeachment merely served to increase his popularity at home, where he was promptly elected a member of the State Senate and chosen president thereof.

Blouse, blouz, a loose over-garment extensively worn by European laborers. Its use is so common among the workmen of France that the term the "Blouses" has become a synonym for this class. In England the same garment is known as a smock-frock. It is generally made of coarse linen, while the German blouse is sometimes of woolen material.

Blow, John, English musical composer: b. 1648; d. 1708. He became organist of Westminster Abbey at the age of 21, and in 1676 also organist of the Chapel Royal, and obtained the degree of Doctor of Music. In 1680 he resigned his post in Westminster Abbey to his pupil Purcell. In 1699 he was appointed composer to the Chapel Royal. He was a voluminous composer, but many of his works have never been printed. Among his sacred pieces are upward of 100 anthems, 14 church services, and various other compositions. A number of his secular compositions for one, two, or three voices, with accompaniment, were published under the name of 'Amphion Anglicus.'

Blow-fly, a common fly belonging to the family *Muscida*. It is the large, noisy fly which enters houses, and was named *Calliphora vomitoria* by Linnæus. It is black on the head and thorax, while the abdomen is steel-blue. It is similar to the flesh-fly in habits, but instead of living larvæ it deposits its eggs which are long and cylindrical, in stacks ("fly-blows") on meat, cheese, etc. The larvæ hatch in 24 hours; they become fully grown in probably five or six

days, and transform into pupæ enclosed by a brown shell (puparium), formed by the drying and contraction of the larval skin. Oily or greasy substances are avoided by them, and by all other flies, and a cloth dipped in kerosene oil and suspended in a room will keep them from entering it. Another blow-fly is *Calliphora erythrocephala*, common to Europe and North America.

Blowgun, a weapon formerly used by the Indians inhabiting the shores of the Gulf of Mexico and still employed by some of the Indian tribes of South America, both in war and for killing game. It consists of a long, straight tube in which a small poisoned arrow is placed, and forcibly expelled by the breath. The tube or blowgun, called *gravatana*, *puncuna*, etc., is 8 to 12 feet long, the bore not generally large enough to admit the little finger. It is made of reed or of the stem of a small palm. Near Pará it is in general very ingeniously made of two stems of a palm (*Iriarteia setigera*) of different diameters, the one fitted into the other. In some places the inner tube is formed of the thin stem of a reed, protected by an outer one of this palm. A sight is affixed to it near the end. The arrows used in that district are 15 to 18 inches long, made of the spines of another palm, sharply pointed, notched so as to break off in the wound, and their points covered with curari poison. A little soft down of the silk-cotton tree is twisted round each arrow, so as exactly to fit the tube. In Peru, arrows of only one and a half and two inches long are used, and a different kind of poison seems to be employed. An accidental wound from one of these poisoned arrows not infrequently proves fatal. In the hand of a practised Indian the blowgun is a very deadly weapon, and particularly when directed against birds perching in the tops of high trees. As his weapon makes no noise, the hunter often empties his quiver before he gathers up the game, and does more execution than a sportsman could with a double-barreled fowling-piece. In Borneo the Dyaks have a similar weapon called a *sumpitan*, which has an iron head tied on the end, so that it can be used as a spear. It is employed both in war and in hunting. Small arrows, which have on their end a piece of pith adapted to the bore of the tube, are used. These are pointed with sharp fish-teeth, poisoned with upas. They are blown with great accuracy; and if the upas juice is fresh, a wound from an arrow fired at a distance of 40 yards proves fatal to man.

Blowing-machine, a machine supplying large furnaces with a blast of air. It is necessary that the current of air should be propelled into the furnace with a certain rapidity and volume, and also with regularity; for which purpose many contrivances have been employed.

Bellows.—In minor operations two pairs of bellows may be used, so that while the one is emptying the other may be filling. Or what is called the double-bellows may be used, consisting practically of two bellows joined together by one of their boards, so that there are three boards instead of two, and two chambers instead of one. The upper chamber, to which the exit-pipe is attached, is filled from the lower, which is itself filled by means of a lever in the same way as the single bellows. The upper chamber is thus always supplied with air, which is forced

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out through the exit-pipe by a weight or spring.

Piston Blowers.—For blast furnaces and for Bessemer steel converters, blowing engines of large size are employed. In the former, the strength of the blast sometimes is as high as 10 pounds per square inch. For the Bessemer converter, where a much greater pressure is required, it occasionally reaches 30 pounds per square inch. A blowing engine consists of a steam cylinder, an air cylinder, and a large air chamber, to ensure a uniform blast. Sometimes the latter is dispensed with, and large main pipes used instead. The blowing cylinder is of cast iron, with an airtight piston, which, as it ascends and descends with the motion of the engine, alternately inhales and expels the air at each end. To effect this, a series of valves are provided and these are arranged as follows: Inlet valves are placed on the top of the cylinder, and also on three sides of the box, but on the fourth side there are two outlet valves. These valves consist of numerous openings, against which leather flaps lie when they are shut. Valves of a similar nature are placed at the bottom of the cylinder. When the piston descends, it would create a vacuum in the upper portion of the cylinder, provided there were no openings in it; but the external air pressing on the inlet valves, opens them, and fills the space above the piston; at the same time, the outlet valves, which only open outward, are tightly closed by the air pressing inward from the pipe. Again, when the piston ascends, it compresses the air above it, and exactly reverses the action of the valves; that is to say, it shuts the inlet valves, opens the outlet valves, and allows the compressed air to pass along the outlet pipe, which is made of large size, so as to offer as little resistance as possible to the passage of the air. The valves at the bottom of the cylinder work exactly in the same way, the inlet valves opening when the piston ascends, and shutting when it descends, thus compelling the inhaled air to pass into the pipe, by the lower outlet valves. The air is conducted by the pipe into a receiver of large capacity, which serves to equalize the blast before it passes to the tuyeres. A blast engine at Shelton Ironworks, in England, with a blowing cylinder 8 feet 4 inches in diameter, a 9-foot stroke, 186 horse-power, and making 32 single strokes of the piston per minute, inhales 15,700 cubic feet of atmospheric air per minute; but this is compressed by the blowing cylinder to a pressure of 3 pounds per square inch above the atmosphere, which reduces the volume supplied by the cylinder to 13,083 cubic feet. Its volume, however, is largely increased again, when raised to the hot-blast temperature, before entering the furnace.

Jet Blowers.—In the Catalan forges of Spain, the south of France, and some parts of the United States, there is a very ingenious water blowing-machine in use called a *trompe*; but it can only be advantageously employed where a fall of a few yards of water is available. A cistern to act as a reservoir for the water; pipes (generally two in number), through which it descends; and a wind-chest to allow the air and water to separate, constitute the essential parts of the apparatus. It is put in operation by lifting the wedge with a lever; this allows the water to rush down the pipe, and, in doing so, draws in air through sloping holes, called

aspirators, at the throat of the pipe. A continuous current of water and air is thus supplied to the wind-chest, which is provided with an opening for the escape of the water, while the air passes out in a regular stream by the nozzle-pipe. The height from which the water falls determines the tension of the blast; but the height seldom exceeds 27 feet, which gives a pressure of from $1\frac{1}{2}$ to 2 pounds to the square inch. The separation of the air from the water is greatly promoted by the current impinging on the platform.

Fans.—The fan is another machine for producing blasts of air. It is employed for such purposes as the melting of pig iron in foundries and for forge fires. It is also used as an exhaust to withdraw foul air from mines, public buildings, and ships. For mines it is occasionally of a very large size. The winnowing of corn is another application of it. The common blast fan is like a wheel with the arms tipped with vanes or blades, instead of being joined by a rim, and it is placed usually in an eccentric position, inside a chest, with central openings on each side for the admission of air. It is generally driven by steam power, and as it revolves, air is sucked in at the centre, drawn toward the tips, and impelled forward through the exit-pipe. Blast fans seldom exceed 3 feet in diameter. The number of revolutions made per minute ranges from 700 to 1,800; but the pressure of the fan blast does not usually go beyond 6 ounces per square inch for ordinary foundry cupolas. Schiele's fan has numerous curved blades and is nearly noiseless. It does not require much power to drive it, and has been very much used. Lloyd's fan has also curved blades, but they are fewer in number than in Schiele's.

Positive Blowers.—These are machines introduced in comparatively recent years. They act by regular displacement of the air at each revolution, since their pistons or drums closely fit their cases. In this respect they differ from fans, because, although there were no outlet for the blast, a fan could be kept revolving, but in such a case a pressure blower would stop. The rotary blower of Roots, of Connorsville, Ind., is one of the best known, and is now very largely used in producing blasts in metallurgical operations, as well as for other purposes, in the United States and Europe. Its most improved form consists of a pair of horizontal shafts traversing a case of the form of two semi-cylinders, separated by a rectangle equal in depth to the diameter of the semi-cylinders, and in width to the distance between the centres of the shafts. These shafts carry a pair of solid arms or pistons, the relative positions of which are maintained by external gearing at both ends provided with safety coverings. Each has a section somewhat resembling the figure "8", the action of which, as they revolve, takes the air in by an aperture at the bottom of the machine, and expels it with considerable pressure, if required, at the top. It gives a much greater pressure of blast than is attainable by the fan. Another machine of this kind, designed by J. G. Baker, of Philadelphia, is employed for the same purposes as Root's. It has a central drum with two vanes fairly fitting the two ends and the bored semi-cylindrical top of the case. Two lower drums, crescent-shaped in section, work by external gears at double the velocity of the central

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drum, the vanes of which move successively through the opening in each of the lower drums. The latter turn so as alternately to form abutments to prevent escape of air from either the entrance or delivery side. These rotary blowers produce blasts from a few ounces up to 3 pounds per square inch.

Blowitz, Henri Georges Stéphane Adolphe *Oppér de*, ön-rē zhōrhzh stā-fan äd-ölf öp-per dē blō-vitz, French journalist: b. Pilsen, Austria, 28 Sept. 1832; d. Paris, 18 Jan. 1903. He settled in France; was successively appointed professor of German in the Lycée of Tours and at Limoges, Poitiers, and Marseilles; was naturalized a French citizen in 1870; and became the Paris correspondent of the London *Times* in 1871. Laurence Oliphant was then the correspondent at Paris, and de Blowitz became his assistant. During the war of 1870-1 Mr. Oliphant was excluded from Paris during the siege by the Germans, but de Blowitz, by means of carrier pigeons, balloons, and numerous ingenious devices, kept his chief outside the city walls informed as to what was going on within the beleaguered city. He was noted for his success in obtaining secret and important information long before it was ready for official promulgation; and for his personal interviews with Thiers, Bismarck, Comte de Chambord, Alfonso XII., Gambetta, the Comte de Paris, the Sultan of Turkey, Marquis Tseng, the King of Rumania, Leo XIII., Jules Ferry, Duclerc, Prince Lobanoff and many other eminent men of the time in Europe. Many of his disclosures in his letters to the *Times*, such as the text of the Treaty of Berlin, which he forwarded before it had been signed, created much excitement throughout Europe. He contributed more than 4,000 columns to the *Times*; was made an officer of the Legion of Honor, an officer of the Institute of France, and doctor of philosophy. He published 'Feuilles Volantes' (1858); 'L'Allemagne et la Provence' (1869); 'Le Mariage Royal d'Espagne' (1878); 'Une Course à Constantinople' (1884). He retired from his position as *Times* correspondent only three weeks prior to his death.

Blowpipe, an instrument by means of which the flame of a candle, a gas-jet, etc., is made to produce an intense heat, being then employed for a variety of useful purposes. Its most usual form is described in the article on blowpipe analysis (q.v.). It is employed by jewelers and goldsmiths in the work of soldering, and by other workers on small metallic objects; by the glassblower in making thermometers, barometers, and other glass instruments; by the enameler; and indeed wherever it is required to subject a small body to a strong heat. It has undergone a variety of improvements in the hands of the chemist, to whose researches it has proved an excellent auxiliary. Wollaston's portable blowpipe is formed of three pieces fitted into one another when in use, but which may be taken down and made to slide within each other. Most laboratory blowpipes have a hollow bulb or enlarged part at or near the end, the object of which is to condense the vapor of the breath, which often proves injurious in the common form of the instrument. To prevent corrosion from the action of the moisture, the bulb is made either of silver or sheet-tin, and it is capable of being opened in order that

it may be more easily cleaned. A little practice is necessary to enable the operator to keep up a constant blast for any length of time, the current of air being propelled through the pipe by the muscular exertion of the cheeks, while respiration is carried on through the nose. But when the process has to be long continued, the current of air is supplied by bellows. This is the form commonly used by glassblowers. The gas blowpipe, commonly called the oxyhydrogen blowpipe, is a very important and intensely powerful variety, whose structure is due to Mr. Newman of London. Sir Humphry Davy suggested the employment of other gases instead of common air, and Dr. Clarke of Cambridge adopted the suggestion. Dr. Clarke found that a mixture of two volumes of hydrogen and one of oxygen produced the greatest effect. These gases are contained in a bladder attached to the end of a pipe which leads into a vertical cylinder, in which is fitted a piston, working through a collar at the top. By the action of this piston the gas from the bladder is compressed into a copper chamber, and thence issues to the flame through an ordinary blowpipe nozzle. To guard against explosions, the gases are kept in separate holders, and by means of a special kind of burner are prevented from mixing until they are just going to be burned. There are various other species of blowpipe, and many uses to which they may be applied. For information on the subject see Plattner, 'On the Blowpipe' to whom the present form of the instrument is due.

Blow'pipe Analysis, a branch of chemical analysis in which the composition of the substance under examination is inferred from its behavior when subjected to certain flame tests. The blowpipe itself commonly consists of a tapering brass tube about eight inches long, provided with a bell-shaped mouthpiece at one end, and at the other with a nozzle that is turned at right angles to the general length of the instrument. The nozzle should be tipped with platinum, and provided with a very minute perforation through which the operator blows a tiny blast of air that drives the flame of his lamp against the object to be analyzed. The flame used in blowpipe work should not be round and colorless, like those of spirit lamps and Bunsen burners, but should be flat and luminous, containing plenty of free, incandescent carbon. A large candle-flame serves very well, although it is not flat. Usually a gas-flame is employed, in connection with a burner formed by flattening a piece of brass tubing, and then cutting it off at the top, at an angle. When the blowpipe is in service its tip is introduced into the flame of the lamp, which the air-blast deflects laterally in the form of a long, almost non-luminous cone, which consists of two visibly different portions. The inner part is somewhat brighter, and is richer in unoxidized gases. The outer layer, being more plentifully supplied with oxygen, consists almost entirely of completely oxidized gases. The outer portion of the blowpipe flame is called the "oxidizing flame," since this part, when directed against the specimen under examination, heats it while it is in contact with the air, and causes it to oxidize, if it is capable of doing so at the temperature that is attainable by the blowpipe. The inner portion of the flame is called the "reducing flame,"

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from the fact that when the specimen is exposed to this part, it is heated, not in contact with the air, but while surrounded with an atmosphere of partially unoxidized hydrocarbon gases. Under these circumstances many metallic oxides give up their oxygen to the hot hydrocarbon gases in which they are bathed, and are themselves reduced to the metallic form. If a flame still richer in free carbon and unconsumed hydrocarbons is desired, the tip of the blowpipe is held just outside of the lamp-flame, and a jet of flame with a luminous tip containing particles of solid carbon can easily be thrown down upon the specimen.

In blowpipe analysis there is no recognized "scheme" to be followed out. The method is oftenest used for the determination of minerals, and in such cases the analyst usually has some sort of idea, in advance, of the elements that may possibly be present. The substance to be examined is usually first pulverized, and a portion of it heated in a tube that is open only at the upper end. If it carbonizes, it contains organic matter of some kind, and the odor that is produced is often a good indication as to whether the organic matter is of an animal or vegetable nature. If the substance, when heated in the closed tubes, gives off water which condenses in the upper part of the tube, the moisture so condensed should be tested with litmus paper. If it is neutral, the substance is a hydrated compound, or a hydroxide. An acid reaction indicates acid salts, and an alkaline one may usually be taken to indicate the presence of compounds of ammonia. If the substance melts but does not change its color, it is an alkaline or a hydrated salt. If it melts and turns yellow, remaining yellow even after cooling, it contains oxide of bismuth; while if it melts to a yellow color, but turns red upon cooling, it contains oxide of lead. If it does not melt, but changes color, the indications are as follows: Yellow, both hot and cold, indicates stannic oxide; if yellow while hot, but white when cold, zinc oxide; if black while hot, and reddish-brown when cold, ferric oxide; if black while hot, but bright red when cold, mercuric oxide. If gas is evolved, its nature should be determined. Oxygen may be detected by the kindling of a glowing splinter of wood inserted into the tube; carbon dioxide by its extinguishing such a spark promptly; carbon monoxide by the gas burning with a bluish flame when ignited at the mouth of the tube; sulphur dioxide, ammonia and cyanogen, by the odor. Oxygen indicates chlorates, peroxides, etc.; carbon dioxide indicates carbonates or oxalates; carbon monoxide indicates oxalates or formates; sulphur dioxide indicates certain sulphites or sulphates; cyanogen indicates cyanides; and ammonia indicates some compound of that substance. If the gas is reddish-brown in color, bromides, nitrates, or nitrites, are probably present; if it is violet, an iodide is indicated. A sublimate may also be deposited upon the tube. If the sublimate is black, or nearly so, selenium or mercuric sulphide are indicated; if yellow, sulphur or a sulphide; if white, a salt of ammonia or mercury, a volatile organic acid, or an oxide of antimony or arsenic. Gray metallic globules indicate mercury, and a metallic mirror may represent either antimony or arsenic.

When the substance is heated in an inclined tube, open at both ends, similar indications are

to be observed; modified somewhat, however, by the fact that oxygen can now pass up through the tube and come in contact with the specimen under examination. Thus sulphides are commonly oxidized in the open tube, arsenic will sublime as the trioxide and not as the metal, and selenium gives a sublimate that may be gray or red, and also a strong odor of horse-radish.

The color that the specimen communicates to the non-luminous part of the flame is likewise of great service in determinations by the blowpipe. A piece of platinum wire, bent at the end into a small loop, is dipped in hydrochloric acid and held in the flame, this process being repeated several times until the analyst is confident that the wire itself is free from any substance that can color the flame. The little loop at the end is then brought into contact with some of the finely pulverized specimen, and introduced into the flame again. Sodium gives a strong lasting yellow; calcium an orange red; lithium and strontium a crimson; potassium a lavender; barium an apple green; thallium, copper, and boracic acid a brighter green; lead and antimony a pale blue; selenium a deep blue. The yellow due to sodium is so powerful, even when that metal is present only in slight amounts, that the colors due to the other metals present are sometimes difficult to observe by the unaided eye. Hence colored glasses are often used, through which to take note of the flame color; the tint of the glass being selected so as to cut off the yellow light of the sodium, while allowing the particular color that is sought to pass through unobstructed. Cobalt blue glass, for example, is used in this way in testing, by flame coloration, for potassium.

When a sample of the specimen to be analyzed is heated upon charcoal, it is often possible to obtain some of the elements that are present, in the form of a metallic bead, by the reduction of their oxides or of the other compounds in which they were originally contained. Lead, tin, and silver give beads that are white and malleable; copper gives a malleable red bead; antimony and bismuth give brittle beads; and iron, cobalt, and nickel may often be obtained in the form of gray, magnetic powders.

While the substance is being heated upon charcoal, an incrustation commonly forms on the charcoal, from the character of which useful inferences can be drawn. Thus antimony gives a white incrustation; bismuth, an incrustation that is deep yellow when hot and lighter yellow when cold; lead, one that is light yellow when hot and deep yellow when cold, and is surrounded by a white border; arsenic gives a white incrustation that is very volatile; and with zinc the color is yellow when hot and white when cold.

Many metallic oxides are soluble in melted borax, and valuable color indications are obtained by heating small quantities of the substance in little beads of melted borax, that are held in the flame upon tiny loops of platinum wire. The phenomena that are observed in this way are quite complicated, however, and for an account of them the manuals on blowpipe analysis should be consulted. See Cornwall, 'Manual of Blowpipe Analysis'; Moses and Parsons, 'Elements of Mineralogy, Crystallography, and Blowpipe Analysis'; Dana, 'Minerals and How to Study Them.'

BLUCHER

Blücher, Gebhard Leberecht von, gëb'härt lā'be-rēht fōn blū-kēr (PRINCE OF WAHLSTADT, val'stāt), Prussian soldier: b. Rostock, 16 Dec. 1742; d. Krieblowitz, Silesia, 12 Sept. 1819. When 14 years of age he visited the island of Rügen, where the sight of some Swedish hussars aroused a desire to become a soldier, and in spite of the opposition of his parents and relatives he took service in a Swedish regiment as cornet. His first campaign was against the Prussians, and he was taken prisoner by the same regiment of hussars which he afterward commanded. The commander of this regiment, Col. von Belling, induced him to enter the Prussian service. An exchange was agreed upon with the Swedes, and Blücher was made lieutenant in Belling's regiment. Discontented at the promotion of other officers over his head, he left the army, devoted himself to agriculture, and by industry and prudence acquired an estate. After the death of Frederick II. he became a major in his former regiment, which he commanded with distinction on the Rhine 1793-4. Orchies, Luxemburg, Frankenstein, Oppenheim (16 Jan. 1794), Kirrweiler and Edisheim in the Palatinate, bear witness to his achievements. After the battle of Kirrweiler, in 1794, which added greatly to his reputation, he was appointed major-general of the army of observation stationed on the lower Rhine. In 1802, in the name of the king of Prussia, he took possession of Erfurt and Mühlhausen. On 14 Oct. 1806, he fought at the battle of Auerstädt. He then, with the greater part of the cavalry, followed the retreat of the Prince of Hohenlohe to Pomerania. His squadron, moving on the left of the main army, became separated from it, and the Prince of Hohenlohe was forced to surrender at Prenzlau. Blücher, cut off from Stettin by this accident, threw himself into Mecklenburg where he joined at Dambeck the corps of the Duke of Weimar, commanded by Prince William of Brunswick-Oels. All the troops, however, were too much fatigued to undertake any enterprise. Having the Grand Duke of Berg on his left flank, the Prince of Ponte Corvo in his front, and Marshal Soult on his right, Blücher was obliged to take post behind the Trave in order to draw off the three great divisions of the French forces from the Oder as long as possible. With this view he entered the territory of the free city of Lübeck, which was soon stormed by the French. Although Blücher escaped with some troops he was obliged to surrender at Ratkau on 6 November, but with a clause in the capitulation that he "accepted it only from want of ammunition, provisions, and forage." He was soon exchanged for the French general Victor, and on his arrival at Königsberg was placed at the head of a corps and sent to Swedish Pomerania to share in the defense of Stralsund and to assist the efforts of the Swedes. After the Peace of Tilsit he labored in the department of war at Königsberg and Berlin. He then received the chief military command in Pomerania, but at the instigation of Napoleon was afterward dismissed from the service. In the campaign of 1812, when the Prussians assisted the French, he took no part; but no sooner did Prussia rise against her oppressors than Blücher, already 70 years old, engaged in the cause with all his former activity. He was appointed commander-in-chief of the Prussian army and the Russian

corps under Gen. Winzingerode, which at a later period was separated from him. In 1813 he was created field-marshal. His heroism in the battle of Lützen (2 May 1813) was rewarded by the Emperor Alexander with the order of St. George. The battles of Bautzen and Hanau, those on the Katzbach (26 Aug. 1819) and Leipsic added to his glory. On the Katzbach Blücher defeated the army of Marshal Macdonald and delivered all Silesia. On 3 October Blücher crossed the Elbe at Wartenburg, and encouraged the Bohemian army under Schwartzberg, and the northern army under the crown-prince of Sweden, to act with more spirit. On 16 October he gained a signal advantage over Marshal Marmont at Möckern, forcing his way as far as the suburbs of Leipsic. On the 18th, in connection with the crown-prince of Sweden, he contributed greatly to the defeat of the enemy, and on the 19th his troops made the first assault upon Leipsic. His promptitude and peculiar manner of attacking had already procured him from the Russians the name of "Marshal Forward." On 1 Jan. 1814, with the Silesian army, which now consisted of two Prussian, two Russian, one Hessian, and one mixed corps, he crossed the Rhine at Kaub, took possession of Nancy on the 17th, gained (1 February), the battle of La Rothière, and pushed forward toward Paris. His detached corps were, however, checked by Napoleon; yet Blücher, though with a great loss, effected his retreat toward Châlons. He then crossed the Aisne at Soissons, joined the northern army, obtained (9 March) a victory over Napoleon at Laon, and, in connection with Schwartzberg, at the close of the month, pressed forward to Paris. The day of Montmartre crowned this campaign, and on 31 March Blücher entered the capital of France. For this triumph he was created Prince of Wahlstadt, with a suitable income. In England, whither he followed the allied monarchs in June of the same year, he was received with enthusiasm. The University of Oxford conferred on him the degree of Doctor of Laws. He then lived on his estates in Silesia till 1815, when the chief command was again committed to him, and he led his army into the Netherlands. On 15 June Napoleon threw himself upon him, and Blücher, on the 16th, was defeated at Ligny. In this engagement his horse was killed, and he was thrown under his body. In the battle of the 18th Blücher arrived at the most decisive moment upon the ground, and, taking Napoleon in the rear and flank, assisted materially in completing the great victory of Belle Alliance, or Waterloo (q.v.). He refused the proffered armistice, and forced Paris to surrender; opposing with energy, on this second conquest of the capital, the system of forbearance practised on the former occasion. As he was already a knight of all the military orders of Europe, the king of Prussia, to reward his new services, created the new order of the Iron Cross expressly for him. After the Peace of Paris he retired to his estate, where he died. On the anniversary of the battle on the Katzbach, a monument commemorating his glory, executed by Schadow in Berlin, was erected at Rostock. On that of Waterloo (18 June 1826) a bronze statue 12 feet in height, modeled by Rauch, was erected to his memory in Berlin. Blücher was not so eminent for military science as for ability in action. His simplicity, good nature, and bravery endeared him to his sol-

BLUE—BLUE BOY

diers, who loved him as a father. His addresses and proclamations are distinguished for their brevity, precision, and simplicity. Consult 'Blücher's Life,' by Varnhagen von Ense (Berlin 1827); and Scherr's 'Blücher's Life and Times' (Leipsic 1862).

Blue, Victor, American naval officer: b. North Carolina, 6 Dec. 1865. He graduated at the naval academy June 1887, and serving through the grades of ensign and junior lieutenant, was promoted lieutenant 3 March 1899. At the outbreak of the war with Spain he was ordered to the gunboat Suwanee, and while on duty off the Cuban coast captured two Spanish patrol sloops having on board a heliographic signal outfit. On 11 June 1898 he landed at Aserraderos, passed through the Spanish lines, proceeded to the hills overlooking Santiago city and harbor, where he located the Spanish fleet commanded by Admiral Cervera. On 25 June he made a further reconnaissance and mapped the position of the Spanish ships. To accomplish these things he traveled a distance of nearly 140 miles, mostly through territory occupied by the intrenchments of the Spanish army. Admiral Sampson highly commended the manner in which these tasks had been performed and recommended that Lieut. Blue be advanced ten numbers as a promotion. He was placed in command of the captured gunboat Alvarado, and on 12 Aug. 1898 bombarded the fortifications of Manzanillo. Since then he has served in China and the Philippines.

Blue, one of the seven primary colors. The blue pigments commonly employed by artists are few in number, including native and artificial ultramarine, cobalt, indigo, and Prussian blue. Genuine ultramarine, prepared from the mineral lapis lazuli, and ordinary cobalt blue, sold for artists' work, are permanent colors. They are used either alone, or mixed with other pigments, chiefly for skies and distances in landscape, and by themselves, or to make up grays and other mixed tints in figure painting. Owing to the exceptionally high price of real ultramarine, the artificial color, which is of doubtful permanency, is usually substituted for it. Prussian blue and indigo are highly useful colors, since it is only these that yield dark blues, and only from them, mixed with yellows or browns, that strong greens can be obtained. It is unfortunate accordingly that both are more or less fugitive. All the blues above named are used both in oil or water color painting, but indigo less than the others in oil, since it is most apt to fade in that medium.

A number of different names are used in commerce for what is essentially the same pigment, or for pigments closely resembling one another. The following statement gives some explanation of these: Cobalt blues are mixtures of cobalt with earthy or metallic bases, which have been subjected to the action of heat, and have received the following names: Cobalt blue, cerulean blue, royal blue, Dumont's blue, Saxon blue, Thénard's blue, Leithner's blue, Hungarian blue, Zaffre or enamel blue, Vienna blue, azure blue, and Paris blue. The last name is also applied to a Prussian blue, and azure is also given to a variety of ultramarine blue. Smalt is a powdered cobalt glass used in illumination and flower painting. Artificial ultramarine is also called French ultramarine, French blue, new

blue, and permanent blue. Coarse qualities of this color are largely used by house painters. Intense blue is a refined indigo. Prussian blue (sesqui-ferrocyanide of iron) is otherwise named Berlin blue, Paris blue, and ferrocyanide of iron. The name Paris blue is also given to a cobalt color. Antwerp blue is a variety of Prussian blue made lighter by the addition of an aluminous base, and not so permanent. Blue ochre (hydrated phosphate of iron) is a subdued permanent blue, but not much employed. Blue verditer is a hydrated oxide of copper which changes and ultimately blackens by time. It is used in distemper work and paper staining. Blue was adopted as their distinctive color by the Scottish Covenanters in the 17th century and is the usual color of the uniforms of the soldiers of the United States army. A dark shade of this color is generally worn by the sailors of most countries, whence the term navy blue is derived.

Blue Beech. See HORNBEAM.

Bluebird. This North American thrush is widely distributed throughout the United States, where it holds a similar place, in the hearts of the people, as the redbreast in England. In fact, locally, it is sometimes termed "blue-robin." It is a smaller bird than the rest of the thrushes. Its whole upper parts are sky blue, shot with purple, with its throat, neck, breast, and sides reddish chestnut, and part of its wings and its tail feathers black. The "soft and agreeable warble" of the bluebird is one of the first and most welcome sounds of bird-music, that we hear in the early spring. The male is remarkably attentive to his more protectively colored mate, and takes exuberant pride in their five or six pale-blue eggs, laid in holes in the trees of gardens, and often also in bird-boxes, and in the crevices in the walls of outbuildings. There are often two broods in a season. The bluebird fights hard to protect his small, neatly constructed nest from the house-sparrow, swallows, wrens, and other birds, which make his life miserable by their intrusion on his domestic privacy. Several other sorts of birds, of other countries, prevailing blue in color, receive the name "bluebird," such as the "Oriental fairy-bluebirds" of the genus *Irena*, more particularly *Irena puella*, one of the East Indian bulbuls.

Blue Books, the official reports, papers, and documents printed for the British government to be laid before the Houses of Parliament. They are so called simply from being stitched up in blue paper wrappers, and include bills presented to, and acts passed by, the houses; reports and papers moved for by members or granted by government; reports of committees; statistics of trade, etc. The term is used also in a broad way as descriptive of special reports put forth by the government of any country or its various executive departments. In the United States the published lists of government employees and the navy regulation manual are known as Blue Books and the foreign diplomatic correspondence is commonly issued in Red Books. French official reports, etc., are called Yellow Books; those of Italy are styled Green Books, and those of Spain Red Books.

Blue Boy, The, a celebrated picture by Gainsborough, dated 1679; its subject, a boy dressed in a blue satin 16th century costume.

BLUE-COAT SCHOOL — BLUE LAWS

Blue-coat School. See CHRIST'S HOSPITAL.

Blue Flag. See IRIS.

Blue Grass, Kentucky Blue Grass, June Grass, Meadow Grass, Spear Grass, a species (*Poa pratensis*) of the natural order *Craminae*, native of the cooler parts of the northern hemisphere. The plant is a perennial with very numerous rootstocks and long, soft radical leaves. The more or less leafy stems which rise from one to two feet are terminated by a loose, pyramidal panicle three to four inches long, which readily distinguishes it from its somewhat larger close relative, Texas blue grass (*P. arachnifera*), in which the panicle is contracted and which is further distinguished by its woolly seeds. Blue grass forms a dense sod, which is very resistant to the trampling of stock, upon soils favorable to its growth, and is ranked as the best pasture and lawn grass throughout its range in districts and upon soils adapted to it. It attains its highest development upon limestone soils, and where found growing naturally, is considered to indicate a superior agricultural soil especially useful for stock raising. The Blue Grass region of Kentucky, which also extends into Tennessee, and from which the former State derives one of its popular names, is of limestone formation, and is noted for its superior, strong-boned, well-formed stock, especially horses. Upon soils other than limestone this grass does not produce so well and upon sandy soils it usually fails. Blue grass hay is of high quality, but is produced in too small amount to pay as well as other hay grasses. The hay cut when the seed is in the milky stage, has the following composition: Nitrogen-free extract, 34.3; crude fibre, 24.5; water, 24.3; ash, 7.0; proteid matter, 6.3; fat, 3.6. If the grass be allowed to mature its seed before being cut it is somewhat less nutritive because of the change in the relative proportion of nutrient material to non-digestible matter. The composition of the fresh grass is as follows: Water, 65.1; nitrogen-free extract, 17.6; crude fibre, 9.1; proteid matter, 4.1; ash, 2.8; fat, 1.3. Texas blue grass (*P. arachnifera*) is a valuable species for the Southern States, where Kentucky blue grass is less resistant to the effects of drouth. Both species may be propagated by sowing seed or by setting out pieces of sod, a method most commonly practised with the southern species, because of the difficulty of spreading its woolly seeds evenly. The method is very popular in lawn-making with the northern species. Since the seed of Kentucky blue grass is often of low vitality, and is frequently mixed with chaff, it should be sown rather thickly. A permanent blue grass pasture requires about three years to become established, after which, without much attention, beyond ordinary fertilizing, it may remain profitable for half a century or more. In long settled districts there are occasional pastures of more than 75 years standing.

Blue Grass State, a nickname for Kentucky.

Blue-green Algæ. See CYANOPHYCÆÆ.

Blue Hen State, a nickname for Delaware. During the War for Independence, a certain popular officer of Delaware, named Capt. Caldwell, asserted that a game cock to be unconquerable must be "a blue hen's chicken." This name

was at once applied to his regiment and later to the State and its people.

Blue Island, Ill., a city of Cook County situated on the Calumet River and on the Illinois C., the Chicago, R. I. & P., the Chicago & G. T., and the Chicago & C. T. R.R.'s. It forms a southern suburb of Chicago, about two miles south of the city limits, and is an important manufacturing, commercial, and railroad centre. Among its industries are brick-making, stone-quarrying, etc. There are also smelting-works, oil-works, and breweries. It was settled in 1833 and incorporated in 1872. The municipal organization provides for a mayor with a term of two years, and a city council. The city operates its own waterworks and electric light system. Pop. (1900) 6,114.

Blue Jay. See JAY.

Blue John, a name for fluorspar (q.v.).

Blue Laws, a term sometimes applied to the early enactments of several of the New England colonies, but more frequently limited to the laws of New Haven Colony. The origin of the term is not exactly known. Various conjectures have been made, but the most probable derivation is that given by Prof. Kingsley, who thinks the epithet "blue" was applied to any one who immediately after the Restoration of the Stuarts looked with disapprobation on the licentiousness of the times. Thus, in Hudibras,

For his religion, it was fit
To match his learning and his wit;
'Twas Presbyterian true blue.

That this epithet should find its way to the colonies was a matter of course. It was here applied not only to persons, but to the customs, institutions, and laws of the Puritans, by those who wished to render the prevailing system ridiculous. Hence, probably, a belief with some that a distinct system of laws, known as the blue laws, must somewhere have had a local habitation. The existence of such a code of blue laws is fully disproved. The only authority in its favor is Rev. Samuel Peters, whose 'General History of Connecticut' (1781) is a spiteful, satirical work, full of exaggerations. The traditions upon this subject, from which Peters framed his stories, undoubtedly arose from the fact that the early settlers of New Haven were uncommonly strict in their application of the "general rules of righteousness." Judge Smith, in his continuation of the history of New York, published in 'New York Historical Collections,' Vol. IV., gives evidence against the existence of the blue laws, which is particularly valuable, as it was put on record some 15 years before Peters' history was published. He writes: "Few there are who speak of the blue laws (a title of the origin of which the author is ignorant), who do not imagine they form a code of rules drawn up for future conduct, by an enthusiastic precise set of religionists; and if the inventions of wits, humorists, and buffoons were to be credited, they must consist of many large volumes. The author had the curiosity to resort to them when the commissioners met at New Haven for adjusting a partition line between New York and Massachusetts in 1767; and a parchment covered book of demi-royal paper was handed him for the laws asked for, as the only volume in the office passing under this odd title. It contains the

BLUE LIGHT—BLUE-STOCKING

memorials of the first establishment of the colony, which consisted of persons who had wandered beyond the limits of the old charter of Massachusetts Bay, and who, as yet unauthorized by the Crown to set up any civil government in due form of law, resolved to conduct themselves by the Bible. As a necessary consequence, the judges they chose took up an authority which every religious man exercises over his own children and domestics. Hence their attention to the morals of the people in instances with which the civil magistrate can never intermeddle in a regular well-policed constitution, because to preserve liberty they are recognizable only by parental authority." See Trumbull, 'True Blue Laws of Connecticut and New Haven, and the False Blue Laws Invented by Rev. Samuel Peters' (1876); Prince, 'An Examination of Peters' Blue Laws,' in Annual Report of the American Historical Association for 1898.

Blue Light. See BENGAL LIGHT.

Blue-light Federalists, a term applied to the party in American politics which opposed the War of 1812. In 1813 Decatur made several attempts on dark nights to escape from the blockaded port of New London, Conn. He declared that his failure was due to signals of blue lights flashed from the shore to warn the British. This led to the opponents of the war, who were accused of having shown the lights, being stigmatized as "Blue-light Federalists."

Blue Lodges, a secret association of advocates of slavery, organized about 1854, in Missouri, for the purpose of aiding the work of establishing slavery in Kansas. The members of the order, although citizens of Missouri, crossed into Kansas in 1855 and forcibly deposited their ballots for the pro-slavery candidates.

Blue-Mantle, one of the English pursuivants at arms, connected with the Heralds' College, so styled from the color of his robe.

Blue-mass. See MERCURY.

Blue Monday, a name formerly given in Europe to the Monday before Lent, when the churches were decorated with blue. It was kept as a holiday by classes whose ordinary avocation required them to labor on Sundays. As this led to violent disturbances the custom was legally abolished. The term now signifies a Monday of depression, or blue spirits, particularly among clergymen, but is very loosely used, and by hard-working persons is applied to Monday in general.

Blue Mountains, (1) a beautiful wooded range of mountains in Oregon, from 8,000 to 9,000 feet high, which, with the Powder River Mountains, separate the Columbia River valley from the Great Basin; (2) a mountain chain of New South Wales, part of the great Dividing Range. The highest peak is Mount Beemarang, which attains an elevation of 4,100 feet above sea-level. The range is now traversed by a railway, which attains a maximum height of 3,494 feet; (3) the Central mountain range of Jamaica, the main ridges of which rise to 8,000 feet; (4) the second main ridge of the Appalachians, known also as the Kittatinny Mountains in Pennsylvania, as the Shawangunks in New York. This range should not be confounded with the Blue Ridge (q.v.).

Blue Nile. See NILE.

Blue Nose, a popular nickname for a native of Nova Scotia.

Blue Peter, a blue flag having a white square in the centre, used to signify that the ship on which it is hoisted is about to sail, and for recalling boats. The term is a corruption of Blue repeater, one of the signal flags in the British code. A flag known as the comet is used as a sailing signal in the United States instead of the blue peter.

Blue-pill. See MERCURY.

Blue Point, the southern extremity of Patchogue Bay, Long Island, New York, which lends it name to the well-known oysters, Blue Points.

Blue Print, a positive photographic print from a transparent negative on paper sensitized by potassium ferricyanide and citric acid, giving white lines on blue ground.

Blue, Prussian. See PRUSSIAN BLUE.

Blue-ribbon Army, the name of an English total abstinence society, so called from the color of the membership badge. The organization grew out of the Murphy Movement in America and dates from 1878. About five years later the society become known as the Gospel Temperance Union.

Blue Ridge, the most easterly ridge of the Alleghany or Appalachian Mountains, which extends from the Hudson River southwest to Georgia. It first receives the name of Blue Ridge when it enters Virginia, the western portion of which it traverses. In south Virginia, the range becomes a broad plateau, which is at its widest in North Carolina, and is here crossed by the Black, Cowee, Nantahala, and South mountains, extending transversely to the axis of the Blue Ridge. The highest peaks of the range occur in the Black Mountain group, where are found Mount Mitchell or Black Dome, 6,710 feet; Guyot's Peak, Sandoz Knob, Gibbe's Peak, and a few others over 6,000 feet. In Virginia the Blue Ridge nowhere rises much above 4,000 feet, and in Pennsylvania and New Jersey its height is much less. Several large rivers pierce the ridge, such as the Hudson in the Highlands, the Delaware at the Water Gap, and the Potomac at Harper's Ferry. See also APPALACHIANS.

Blue-stone, or Blue-vitriol. See COPPER.

Blue-stocking, a pedantic woman; a lady regarded as too fond of learning. The origin of this name is thus given by Boswell in his 'Life of Johnson': "About this time (1780) it was much the fashion for several ladies to have evening assemblies, where the fair sex might participate in conversation with literary and ingenious men, animated with a desire to please. These societies were denominated blue-stocking clubs, the origin of which name was as follows: One of the most eminent members of these societies was Mr. Stillingfleet, who always wore blue stockings. Such was the excellence of his conversation, that his absence was felt as a great loss, and it used to be said, 'We can do nothing without the blue stockings'; and thus by degrees the title was established." One of the most famous of these clubs was that which met at Mrs. Montagu's. This was sometimes honored by the presence of Dr.

BLUE THISTLE—BLUEFIELDS

Johnson, and its principal members have been sketched and eulogized by Hannah More, in her poem entitled the 'Bas Bleu.'

Blue Thistle. See BUGLOSS.

Blue-vitriol, called also **Blue-stone**, the salt, sulphate of copper, composed of sulphuric acid, oxide of copper, and water. It is a natural product of some mines of copper ores, and is also largely prepared for economical purposes. See COPPER.

Blueback, the salmon of the Fraser River, B. C., one of the most valuable of the Pacific salmon (q.v.). The name is given to various other fishes having bluish backs.

Bluebeard, a famous hero of legend and folklore, familiarized to English readers in the 18th century through a translation from the French of Charles Perrault, 1697. This tale of Bluebeard has been regarded by some as partly historic, of which the original was Gilles de Laval, Baron de Retz, who was burned at Nantes in 1440 for his cruelty to children, whom he is supposed to have enticed into his castle, where he sacrificed them to the devil. It is, however, really a *märchen*, and the leading idea of curiosity punished is world-wide. The forbidden chamber is a counterpart of the treasure-house of Ixion, on entering which the intruder was destroyed, or betrayed by the gold or blood that clung to him; also of Pandora's box, as well as of Proserpine's pyx that Psyche opened in spite of the prohibition. There are several parallels among the German fairy-tales collected by Grimm; and one feature at least is found in the Kaffir tale of the Ox (Callaway's 'Nursery Tales of the Zulus'). Variants are found in Russia, and among Gaelic popular tales; and in the Sanskrit collection 'Katha Sarit Sagara,' the hero Saktideva breaks the taboo, and like Bluebeard's wife, is confronted with the horrible sight of dead women. Possibly in the punishment following the breaking of the taboo may be a survival of some ancient religious prohibition; among the Australians, Greeks, and Labrador Indians, such an error was regarded as the means by which death came into the world. Frescoes of the 13th century have been found in Morbihan, Brittany, representing scenes from the similar legend of St. Trophime. Tales similar to that related by Perrault are found in Straparola's 'Piacevoli Notti' (1569), and in Abbatutis' 'Il Pentame-rone,' while a not very dissimilar tale is that of the Third Calendar in the 'Arabian Nights Entertainment.' Operas founded upon it are Grétry's 'Raoul Barbe-Bleu' (1789); Offenbach's 'Barbe-Bleu' (1866).

Bluebell, Bellflower, Hairbell, or Harebell, *Campanula rotundifolia*, a plant of the natural order *Campanulaceae*, native of the colder parts of the northern hemisphere. Its common name is suggested by the shape and color of its flowers, and its specific name from the shape of its root-leaves. The stem leaves are lanceolate or otherwise than round. This is the bluebell of Scotland and of literature. It may be found peeping through the snow and ice which are supposed to be melted by the self-generated heat of these little plants. They have long been favorites in the hardy flower border and are of simplest culture. (See also *CAMPANULA*.) The name is also applied to a species of *Scilla* (q.v.).

Blueberry. See HUCKLEBERRY; VACCINIUM.

Bluebill, one of the most common of American fresh-water ducks, which breeds throughout Alaska and the northern part of Canada generally, spending the cold months in the United States, but going only as far south as is necessary to avoid the freezing of the lakes and ponds. The head, neck, and fore part of the body of the drake are black, the head with a green gloss. The back and sides are whitish with finely waved blackish markings. The abdomen and speculum of the wing are white. In the female the head and anterior parts are brown, and the face pure white. The most distinguishing part of the bird is the very broad, spatulate bill, which is light blue, with a black nail. Hence the other names "broadbill," and "scaup duck." There are two species, the larger (*Aythya marila nearctica*) the one just described, which is regarded as a variety of the European scaup duck; and the lesser (*A. affinis*), which is very similar to the preceding, but smaller, and rather more southerly in its distribution. These ducks are close relatives of the canvasback and redhead (qq.v.), and resemble them in habits. Other local names for them are "blackhead" and "shuffler."

Bluebottle, or Corn-flower See CENTAUREA.

Bluebottle Fly, a greenish-blue fly, sometimes called by English authors "green-bottle" fly (*Lucilia caesar*). It closely resembles the blow-fly (q.v.), but is smaller and entirely blue or green. These flies hibernate through the winter, appearing early in spring. Its eggs are deposited upon meat and decaying animal matter. The larvæ are said to be indistinguishable from those of the blow-fly. They are white, footless maggots, of an elongated conical shape, which transform in the ground. It is said that bluebottle flies do not commonly enter houses.

Bluebreast. See BLUETHROAT.

Bluebuck, the name given by English workmen in South Africa to one of the duikers, the pigmy antelope (*Cephalolophus monticola*) of Natal. These tiny creatures, which stand only 13 inches high, are the smallest of the antelopes, and grayish-blue in color, with short, spike-like horns, which hardly show above the tuft of stiff hairs on the top of their heads. They swarm in the thickets of southeast Africa, feeding on herbage berries and buds, scrambling about the rocks, and climbing leaning tree trunks, with amazing agility.

Blue-eye, a small and favorite species of honey-eater (*Entomyza cyanotis*) with a conspicuous patch of blue about the eyes. It frequents the eucalyptus trees, and has the curious habit of depositing its eggs in a neat depression on the top of the big, oven-shaped nest of a certain starling, whenever it can find a deserted one. Otherwise it constructs a nest for itself. See HONEY-EATER.

Bluefields (formerly written BLEWFIELDS), a town of Nicaragua, on the Caribbean coast and at the mouth of the Escondido or Bluefields River. Lat. 12° N., lon. 83° 44' W. It was the capital of Mosquitia (see CENTRAL AMERICA). In the latter part of 1847 the population was about 600, one sixth white, five sixths black. Slavery was abolished in 1841. The king of Mosquitia, who resided here in one of the few

BLUEFIN—BLUING

houses built of boards, claimed sovereignty over a territory 235 miles wide and 340 miles long; also the districts of Talamanca and Chiriqué in Costa Rica. A British agent and consul-general also was stationed at Bluefields, the English government maintaining a protectorate over the Mosquito Indians until 1860. A German colony at Carlsruhe, adjoining Bluefields, was founded in 1844, but abandoned in 1849. The climate is moist and hotter than in the interior. In 1901 the company to which the Nicaraguan government granted a concession and monthly subvention for the establishment of a line of steamers agreed to make six trips a month between Bluefields and New Orleans, and to carry the mails between those points eight times monthly.

Bluefin, or **Blackfin**, a large cisco-like whitefish (*Argyrosomus nigripinnis*) of the deep waters of Lake Michigan and some other of the lakes of Wisconsin and Minnesota, readily known from other species by its black fins.

Bluefish The bluefish or "skipjack" (*Pomatomus saltatrix*) is one of the most widely distributed and abundant of sea-fishes, being found in the Atlantic from the Mediterranean and Novia Scotia to Brazil, and in the Pacific and Indian oceans. It is taken casually at all seasons on the eastern coast of the United States, but becomes numerous irregularly in summer, when its presence or absence seems to be governed largely by the movements of its principal food, the menhaden (q.v.), when seeking their inshore spawning-grounds. The only wonder is that both have not been exterminated many centuries ago, for of all the butchers of the sea the bluefish is the most wolfish and diabolical, snapping its prey in half for a mouthful and passing on in ruthless industry. It is beautifully shaped for swimming, built with the fine lines of the mackerel and the strength of the salmon. It is a near relative of the pompanos and horse-mackerels (family *Carangida*), but is set apart in a family (*Pomatomida*) by itself, which Jordan considers an offshoot toward the percoids. In color it is steel-blue, and its flesh is very sweet and savory. The weight varies, five pounds being the common run, although 20 pounds are recorded.

The favorite method of fishing for it is "squidding," or casting from a platform built out into the surf, with a rod and line armed with a spoon, or a bone-baited hook. Its voracity makes it a free biter, and its temperament makes it a fierce one, so that the angler may expect a fight from the strike to the death, and only by sheer strength can the prey be landed. The bluefish is also trolled for from boats, especially in Florida, and off the south coast of New England.

On our Pacific coast the "California bluefish" (*Cynoscion parvipinnis*) is found from Santa Barbara to Guaymas and Mazatlan, and is a near relative of the eastern weakfish (q.v.), locally called "totuava" (*Cynoscion macdonaldi*). In the Gulf of California it congregates at the mouth of the Colorado River and attains enormous size, having been taken in hand-lines as high as 170 pounds. Like other species of this genus, it is erroneously yet frequently called "sea-bass." The bluefish thrives on sardines and other small fish. Assuming that one bluefish eats 10 small fish a day, it has been figured that it requires ten thousand million sardines to feed

the one thousand billion bluefish on our coasts every summer.

Consult Jordan and Evermann, 'Food and Game Fishes of America' (1902); Goode, 'Fishery Industries, Section 1' (10th census, Washington, 1884); Mayer (editor), 'Sport with Rod and Gun' (1892).

Bluegowns, an order of paupers in Scotland, called also the "King's Bedesmen," to whom the kings annually distributed certain alms on condition of their praying for the royal welfare. Their number was equal to the number of years the king had lived. The alms consisted of a blue gown or cloak, a purse containing as many shillings Scots (pennies sterling) as the years of the king's age, and a badge bearing the words "Pass and repass," which protected them from all laws against mendicity. Edie Ochiltree, who figures prominently in Scott's novel 'The Antiquary,' is a type of the class, but probably a favorable specimen as compared to those who were to be met with in real life. The practice of appointing bedesmen was discontinued in 1833, and the last of them drew his last allowance from the exchequer in Edinburgh in 1863.

Bluethroat, an Old World bird (*Cyanecula svecica*) related to the European robin, and deriving its name from its bright blue throat, which is separated from the white below it by crescent-shaped bands of rust-red and white. It is one of the most highly migratory birds known, spending its winters in tropical Africa and India, and during the summer breeding in Scandinavia, northern Russia, Siberia, and western Alaska. It makes its nest in bushes and weeds along streams, as far north as 71 degrees. It is extraordinary in never being seen in the intermediate countries, between its summer and winter homes, so that it stands to reason that the journey is made at a single flight, either at night, or at an invisible altitude. The blue-throat is celebrated for its fine singing, and powers of mimicry when in its summer home, on account of which the Laplanders call it "the bird of the hundred voices." Consult Gätke, 'Birds of Heligoland' (English translation 1895); and works on European, Siberian, and Alaskan ornithology.

Bluewing, a duck. See **TEAL**.

Bluffs, a term of American origin, synonymous with cliffs. It has long been used to designate the high cliffs met with along the Mississippi River; particularly those abrupt banks of loam on its eastern side below the mouth of the Ohio. These are continually washed and undermined by the action of the river, while the opposite side, rising more gently back from the river, is but slightly washed by its waters. On the south shore of Lake Superior, near the Pictured Rocks, is a most remarkable bluff of loose, blowing sand, which rises so steeply from the edge of the water to the height of 200 feet, that one would in vain endeavor to ascend it. The waves and the winds beat against it from the north, and keep its materials continually in motion; but more sand appears to be always supplied to replace that which is borne away.

Bluing, a compound dissolved in water to whiten clothes after washing. The indigo preparation once largely used has been extensively superseded by Prussian blue.

BLUING OF METALS—BLUMENTHAL

Bluing of Metals, the process of giving a blue color to metallic substances by heat. Iron, when heated, becomes first of a light, then of a darker gold color, and finally blue. Steel heated to redness and suddenly cooled, is rendered hard and brittle. It is restored to any degree of softness, by heating it up to certain temperatures and allowing it to cool slowly. These temperatures are precisely indicated by the color of the film of oxide which forms upon its surface. At 430° F. it is straw yellow of the very hard temper suitable for lancets. At higher temperatures it appears successively a golden yellow, then brown, purple, blue, and finally green. Pale blue at 550° is the temper for swords and watch springs. The common shade of blue, at 560°, is the temper for fine saws and dirks. Deep blue, at 600°, is the soft quality of steel for large saws.

Blum, blün, Ernest, French dramatist: b. Paris, 15 Aug. 1836. Either alone or in collaboration with other dramatists he is the author of many highly successful plays. The drama of 'Rose Michel' (1877), of his own composition, insured his place among the most successful French dramatists of the time. Among his later compositions are 'Adam and Eve' (1886); 'The Nervous Woman' (1888); 'End of the Century' (1890); 'La rieuse' (1894); 'Le Carillon' (1897).

Blum, Hans, hants bloom, German publicist: b. Leipsic, 1841. He is a son of Robert Blum (q.v.), was educated in the universities of Leipsic and Bern, sat in the North German Reichstag 1867-70, and was a barrister in Leipsic 1869-97. He has written extensively on contemporary politics and among his works are 'Die Lügen unserer Socialdemokratie' (1891); 'Fürst Bismarck und seine Zeit' (1894-5); 'Das erste Vierteljahrhundert des deutschen Reichs' (1896); 'Persönliche Erinnerungen an den Fürsten Bismarck' (1900). He has also written two dramas and several novels.

Blum, bloom, Robert, German patriot: b. Cologne, 10 Nov. 1807; d. Vienna, 9 Nov. 1848. He served for a short time in the army, and became subsequently connected with the Leipsic Theatre, of which he acted for some time as secretary and treasurer. About the year 1840 he began to come prominently forward as the champion of the Liberal cause, and acquired much renown as a popular orator. On the outbreak of the commotions of 1848 he manifested great enthusiasm, and became soon the rallying-point of democracy in Saxony, and the leading member of opposition in the National Assembly at Frankfort, to which he was sent that year as member for Leipsic. The events of October at Vienna inspired him with fresh energy, and he proceeded thither at the head of a deputation to express the sympathy of the German democrats in the Frankfort Assembly with the Viennese. He took an active part in the conflict of the citizens with the imperialists; but on the surrender of the capital to Windischgrätz, was arrested with several of his companions on 4 November. Brought before a military tribunal, he pleaded in vain his privileges as a deputy from the German diet, and was condemned to be hanged, a sentence which was changed to death by the bullet.

Blum, blüm, Robert Frederick, American artist: b. Cincinnati, Ohio, July 1857. He

studied at the Philadelphia Academy of Fine Arts, and among his works are 'Venetian Bead Stringers,' which received a prize of \$2,500 at the American Art Association exhibition in New York in 1889. Although he has worked in oils he is best known as a water-colorist and painter in pastels. He is ranked among the most brilliant of American water-color artists.

Blumenbach, Johann Friedrich, yō'hän fréd'rīh bloo'mën-bah, German naturalist of distinction: b. Gotha, 11 May 1752; d. Göttingen, 22 Jan. 1840. He studied at Jena and Göttingen, and was appointed in the latter, in 1776, extraordinary professor of medicine and inspector of the museum of natural history, and in 1778 ordinary professor. In 1812 he was appointed secretary to the Royal Society of Sciences at Göttingen, in 1816 became physician to the king of Great Britain and Hanover, in 1821 was made a knight-commander of the Guelphic Order, and in 1831 was elected a member of the Academy of Sciences at Paris. In 1825 the jubilee of his graduation as doctor was celebrated. On this occasion a medal was struck, and an endowment founded under the name of the Blumenbach Stipendium or Bursary, to assist talented young physicians and naturalists, and enable them to make scientific travels. In 1835 he retired from public life. The first work which brought him into notice was the 'De Generis Humani Varietate Nativa,' and from its publication in 1775 he continued almost for 60 years to exert a powerful influence on the progress of science, both by the number of distinguished pupils who were indebted for their first training to his admirable lectures, and by his valuable writings, partly inserted in the 'Transactions' of scientific societies, and partly published as separate works. Among the latter, in addition to the thesis, which received important additions in subsequent editions, and may be said to have given a direction to the most important studies of his after life, are the 'Institutiones Physiologicae' (1787), long a textbook in many of the most celebrated schools of Europe; the 'Handbuch der vergleichenden Anatomie' (Handbook of Comparative Anatomy), and 'Collectio Craniorum Diversarum Gentium.' The last work gives descriptions and figures of his collection of skulls, one of the most extensive in existence, and still preserved at Göttingen. In regard to the important subject of which it treats, Blumenbach held decidedly that the human race formed only one species, and had originally descended from a single pair; but he divided it into the five varieties of Caucasian, Mongolian, Negro, American, and Malay.

Blumenreich, Franziska, fränts'is-ka bloo'mën-rīh, German novelist: b. Bohemia, 2 April 1849. Among her very numerous novels the more notable are 'At the Abyss of Marriage' (1888); 'Freighted with Bliss' (1890); 'Storms in Port' (1892). She is a zealous advocate of woman's rights.

Blumenthal, Jacob von, yä'kōb fōn bloo'mën-tāl, German pianist and composer: b. Hamburg, 4 Oct. 1820. Going to London in 1840, he became pianist to Queen Victoria, taught music, and was soon well known as a composer of popular pianoforte numbers and equally popular songs such as 'My Queen'; 'The Venetian Boat Song'; 'The Broken

BLUMENTHAL — BLUNT

Flower'; 'The Bend in the River.' The familiar hymn tune, 'Blumenthal,' is an adaptation of his composition, 'The Two Angels.'

Blumenthal, Oskar, ös'kär bloo'mën-täl, German dramatist and critic: b. Berlin, 13 March 1852. Sprightliness of dialogue is the most distinguishing character of his plays; the most successful of them are 'The Big Bell'; 'A Drop of Poison'; 'The Black Veil.' He has published several volumes of critical and miscellaneous essays.

Blundell, (Mrs.) Francis (M. E. FRANCIS), English novelist: b. Dublin. She is the widow of Francis N. Blundell and has lived for many years in Lancashire, but more recently in Dorsetshire. Her writings, which have steadily increased in popularity, both in England and the United States, are: 'Whither?' (1892); 'In a North Country Village' (1893); 'The Song of Dan' (1894); 'Town Mice in the Country, a Story for Children' (1894); 'A Daughter of the Soil' (1895); 'Frieze and Fustian' (1896); 'Among the Untrodden Ways' (1896); 'Maimie o' the Corner' (1897); 'Miss Erin' (1898); 'The Duenna of a Genius' (1898); 'Yeoman Fleetwood' (1899); 'Pastorals of Dorset'; 'Fiander's Widow' (1901); 'North, South, and Over the Sea'; 'The Manor Farm' (1902).

Blundell's School, a famous English free grammar school in Tiverton, Devonshire, founded in 1604 by Peter Blundell, who left his fortune to charities, the school being the most important of his benevolences. In connection with it five Balliol College scholarships were founded and many persons who afterward became eminent went to Balliol College, Oxford, from Tiverton School. The school is mentioned in the novel 'Lorna Doone' as the scene of John Ridd's early education. In 1880 new buildings in the Tudor style were built for the school in the outskirts of the town. The late archbishop of Canterbury, Frederick Temple, was a student at Blundell's School.

Blunderbuss, a short, heavy, large-bored firearm, often brass-barrelled, and bell- or trumpet-mouthed. It was used to discharge a heavy load of slugs or small bullets at a short range, and was once generally employed as a weapon for the defense of houses against burglars. As a military weapon, it was used occasionally on shipboard for repelling boarders, or pouring heavy volleys into boats, when attempting to cut vessels out from anchorage. It is now wholly disused.

Blunt, Edmund March, American author: b. Portsmouth, N. H., 20 June 1770; d. Sing Sing, N. Y., 2 Jan. 1862. He is remembered for his publication of the 'American Coast Pilot' (1796), describing all the coasts of the United States, and containing a vast amount of invaluable information for seamen. More than 30 editions of this work have been published, and it is still in use in the United States and the principal European countries, having been translated into nearly every foreign language. He also compiled a number of nautical books and charts.

Blunt, George William, American hydrographer: b. Newburyport, Mass., 11 March 1802; d. New York, 19 April 1878; a son of Edmund March Blunt (q.v.). He went to sea when 14 years old and served as a sailor till

nearly 21; and in 1822-66 was a publisher of charts and nautical books in New York. He made original surveys of many American harbors; was one of the committee that organized the present system of pilotage for New York; made several revisions of the 'American Coast Pilot'; and was influential in causing the Federal government to adopt the French system of lighthouses and to organize the Lighthouse Board.

Blunt, James G., American soldier: b. Trenton, Maine, 1826; d. Washington, D. C., 1881. He settled as a physician in Anderson County, Kansas, in 1856; became prominent in the contest over the introduction of slavery into that State, and was a member of the convention that framed its constitution. Entering the army as lieutenant-colonel of the 3d Kansas Volunteers, he became brigadier-general, 8 April 1862, and was assigned to the command of the military department of Kansas. As such he was engaged in the battle of old Fort Wayne, defeated Marmaduke at Cane Hill, Ark., and, with the aid of Gen. Herron, defeated Hindman at Prairie Grove, and thus checked the Confederate advance into Missouri. He was promoted major-general, 29 Nov. 1862, and in October 1864 gave the final blow to Price's invasion of Missouri.

Blunt, John Elijah, English consular agent: b. 14 Oct. 1832. He entered the English consular service in 1850, and held various consular posts in Turkey, receiving in 1862 and again in 1868 the thanks of the President of the United States for his services to American citizens in the province of Adrianople. Since 1899 he has been consul at Boston, Mass., with the rank of consul-general.

Blunt, John Henry, English High Church theologian: b. London, 25 Aug. 1823; d. there, 11 April 1884. He held various curacies, and in 1873 was appointed to the living of Beverston, Gloucestershire. He wrote much, among his chief works being: 'Dictionary of Doctrinal and Historical Theology' (1870); 'Dictionary of Sects, Heresies, etc.' (1874); 'History of the English Reformation' (1868-82); 'Household Theology' (1865); 'Annotated Book of Common Prayer' (1866; revised and enlarged, 1884).

Blunt, John James, English divine: b. Newcastle-under-Lyme, 1794; d. Cambridge, 18 June 1855. From 1839 he was Lady Margaret professor of divinity at Cambridge. His works include: 'Sketch of the Reformation in England' (1832); 'Undesigned Coincidences in the Old and New Testament, an Argument for their Veracity' (1847); 'On the Right Use of the Early Fathers' (1857); 'History of the Church During the First Three Centuries' (1856); several volumes of sermons; etc.

Blunt, Stanhope English, American military officer: b. Boston, Mass., 29 Sept. 1850. He was graduated at the United States Military Academy and commissioned 2d lieutenant in 1872; rose through the ranks to major in the ordnance department; served at various posts and arsenals in the West; was a member of several boards, including that which selected the Krag-Jorgensen rifle for use in the army; and had command of the Rock Island Arsenal,

III. He has written 'Firing Regulations for Small Arms,' and numerous papers on the use of small arms.

Blunt, Wilfrid Scawen, English poet and traveler: b. Crabbet Park, Sussex, 17 Aug. 1840. He was attaché of legation at The Hague, Athens, Madrid, Buenos Ayres, and elsewhere; supported Arabi Pasha in the revolt in Egypt in 1881; and was imprisoned in 1888 for his insurrectionary actions in Ireland. He is author of: 'Sonnets and Songs by Proteus' (London 1875); 'The Love Sonnets of Proteus' (1881); 'The Future of Islam' (1882); 'The Wind and the Whirlwind,' political poems (1884); 'Ideas About India' (1885); 'In Vinculis' (1889); 'A New Pilgrimage' (1889); 'Esther: a Young Man's Tragedy' (1892); 'Stealing of the Marc' (1892); 'Griselda' (1893); 'Satan Absolved' (1899).

Blunthead, a columbrine snake of Java and the East Indies (*Amblycephalus monticola*). It is about three feet in length, and purple in ground color, but this is almost entirely concealed by the brown markings and mottlings, and the cheeks and lip-plates are carnation-red. It is perfectly harmless, and is welcomed by the natives to their houses as a vermin-destroyer. It owes its name to the squarish form of the head, which, as in many other species of the family, looks so much like that of a poisonous snake as to deceive most observers.

Bluntschli, Johann Kasper, yō'hän käs'par blünt'shle, Swiss jurist and statesman: b. Zurich, 7 March 1808; d. Karlsruhe, 21 Oct. 1881. He became professor in the newly founded university in that city in 1833; took an active part in the political struggles that divided his country, and at first inclined to the party of reform, until the events of 1839 induced him to join the Conservatives, of whom he was, for a time, a leader. He was a counselor of state, and became a member of the government and of the Federal Directory, and afterward worked for the formation of a moderate Liberal Conservative Party in Switzerland. In 1848 he went to Munich as professor of civil and international law. There he published his 'Allgemeines Staatsrecht' (5th ed. 1876), on which his reputation as a juriscult chiefly rests; 'Deutsches Privatrecht' (3d ed. 1864); and, in conjunction with Arndts and Pozl, 'Kritische Ueberschau der Deutschen Gesetzgebung und Rechtswissenschaft' (6 vols. 1853-8). In 1861 he removed to Heidelberg University, and became a privy counselor of Baden, actively forwarding all Liberal measures in the state. Liberty in ecclesiastical matters he had equally at heart; he acted several times as president of the Protestantenverein, and it was after delivering a closing speech at the general synod of Baden that he died suddenly at Karlsruhe. He was the author of valuable histories of Zurich and of the Swiss Confederation, and of a number of works on law, being especially an authority in international law. His library is now possessed by the Johns Hopkins University at Baltimore.

Blushing, a sudden reddening of the face, caused by a rush of blood into the capillary vessels of the skin. A blush is excited by confusion of mind, arising from surprise or diffidence, modesty or shame, or conscious guilt and apprehension, showing the influence of the

passions and emotions on the nervous system and the circulation of the blood. Sudden fear and apprehension cause the blood to rush from the external surface to the internal organs, leaving the bloodless lips quite pale, and the whole face suffused with deathly pallor. It is a kind of inverse blushing; the one being a sudden flash of color in the face, the other a sudden flash of paleness.

Blüthgen, August Eduard Viktor, ow'-goost ed'oo-ard vik'tor blut'-gēn, German novelist: b. Zorbig, near Halle, 4 Jan. 1844. He has won high distinction as a writer for the young. Among his stories for boys and girls are: 'The Rogues' Looking Glass' (1876); 'The Battle of Frogs and Mice' (1878); and with these is to be classed the letter-press (verses) of O. Pletsch's 'Picture Books.' Of novels and romances he is author of a great many; for example, 'The Peace Breaker' (1883); 'The Step-Sister' (1887); 'Madame the Countess' (1892); etc.

Blyden, Edward Wilmot, a negro author: b. St. Thomas, W. I., 3 Aug. 1832. After vainly seeking, in 1845, admission to some college in the United States, he went to Liberia, and graduated at the Alexander High School, of which he afterward was principal. In 1880 he became president of Liberia College, has held important government positions, and was commissioner to the Presbyterian General Assembly of the United States in 1861 and 1880. He is proficient in many languages, including Latin, Greek, Spanish, Hebrew, and Arabic. He has published: 'Liberia's Offering' (1873); 'From West Africa to Palestine' (1873); 'The Negro in Ancient History'; etc.

Blythe, Herbert. See BARRYMORE, MAURICE.

B'nai B'rith, b'nī b'rēth, **Independent Order of the**, an association of German Jews formed in the United States in 1843. Its purpose is the moral improvement of the members. Its organization resembles that of the Free Masons, but it is not a secret society, and has no elaborate ceremonial. The organization has since been established in Germany, and in the East. At present it has over 400 lodges and 28,000 members.

Bo-tree, the sacred fig of India. See PEERUL.

Boa, a serpent of that section of the family *Boidæ* called *Boinæ*. The boas are mostly of great size, and inhabitants of the forests of tropical America; and, with the pythons, constitute a family of the largest of modern snakes, which are noted for their power to enfold and fatally crush their prey in muscular coils. These serpents are notable not only for great size, but for certain structural peculiarities, of which the most noteworthy and characteristic is the fact that vestiges remain of the pelvis and hinder limbs, which appear externally as claw-like spurs on each side of the vent, which are of service in hanging from trees. The muscular power is very great, the tail is partly prehensile; and the bones of the head, and especially of the jaws, are more than ordinarily loosely joined together (see SERPENT), so that bodies surprisingly large may be swallowed. This family is distributed throughout all tropical regions, and is divided into two sub-families, by diversities of structure. One (*Pythoinæ*) con-

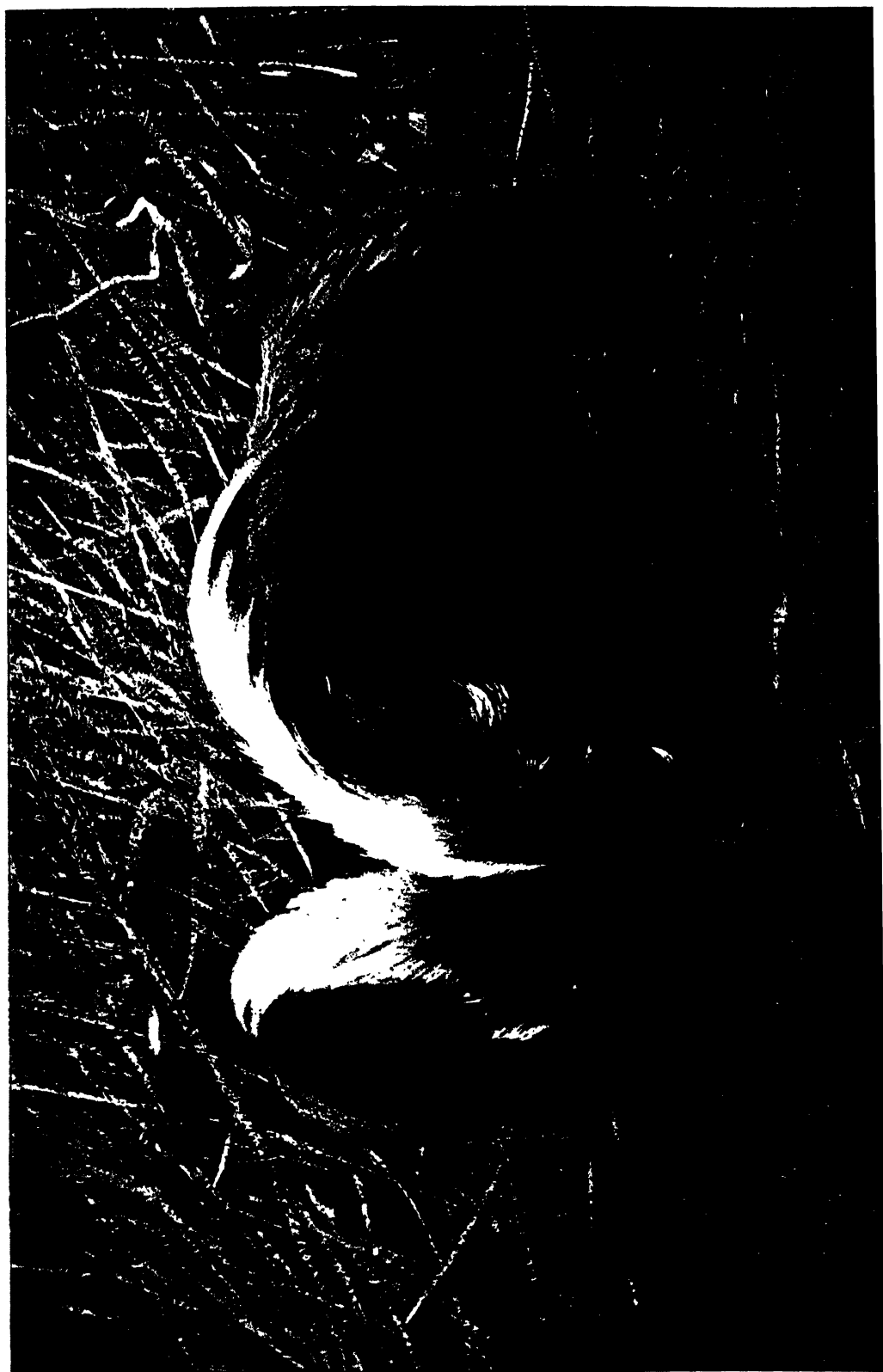
tains the Old World pythons (q.v.), which have a pair of supraorbital bones, some teeth on the premaxilla, and the sub-caudal scales in two rows; while the boas lack supraorbital bones, never have premaxillary teeth and but a single row of scales on the under side of the tail. Most of the 40 or 50 species of *Boia* are American, but several small species inhabit the warmer parts of the Old World. Several of the American boas are very large snakes, perhaps occasionally reaching 30 feet in length, though few carefully measured have exceeded 20 feet; but such a one would weigh several hundred pounds, and be a very formidable foe to the largest animals exposed to their attacks. They inhabit the forests, and climb to the lower branches of the trees, where they seek or await their prey, usually above a path. There the serpent swings about in the air till some luckless animal approaches; then, suddenly relinquishing its position, he seizes the victim, and coils his body spirally round its throat and chest, till, after a few ineffectual cries and struggles, the animal is suffocated, and expires. In producing this effect, the serpent does not merely wind itself around its prey, but places fold over fold, as if desirous of adding as much weight as possible to the muscular effort; these folds are then gradually tightened with enormous force, and speedily induce death. The animals thus destroyed by the larger boas are sometimes as large as tapirs, deer, and even bullocks, but ordinarily the much smaller mammals and birds of the forest, while one species feeds mainly upon aquatic prey. Having crushed and rolled its prey until its bones are broken into pieces, and it is compacted into the form of a sausage, it takes it into its mouth, and at first by the help of the strong recurved teeth on its jaw bones, and later by reflex movements of its throat and ribs slowly engulfs it, the action being facilitated by a copious flow of saliva; but there is no truth in the reputed preparation of the prey by a covering of slime, etc., related in so many books. The process of digestion is slow, and while it is proceeding, the snake is inert, and easily caught and killed.

Several of the larger species are well known and often seen in menageries, where they are easily distinguished by the shape of the head and by the well-defined pattern of the markings. These are exceedingly handsome in most cases, the colors being yellow, buff, chestnut, and varying browns, set off by black and white; and the skins, which may be tanned into good leather with the scales on, are of high commercial value for making purses, belts, and other ornamental articles. Among the best known species are the common boa — the *Boa constrictor* proper (for that term is ignorantly given to all), which is one of the lesser forms, rarely exceeding 10 feet in length. Its home is the region of the Amazon and Orinoco rivers, and it is pale brown, with a chain-like series of dark-brown markings on each side of the spine, enclosing large oblong-oval spots, and a series of large dark spots along the sides, each with a light centre; on the tail the markings become brick-red. Several other species of this genus, some much larger, inhabit South and Central America. One, the imperial boa, has a Mexican variety, often called the *abonia*, which is believed to be the serpent venerated by the ancient Mexicans, and worshipped with bloody sacrifices. Two species of

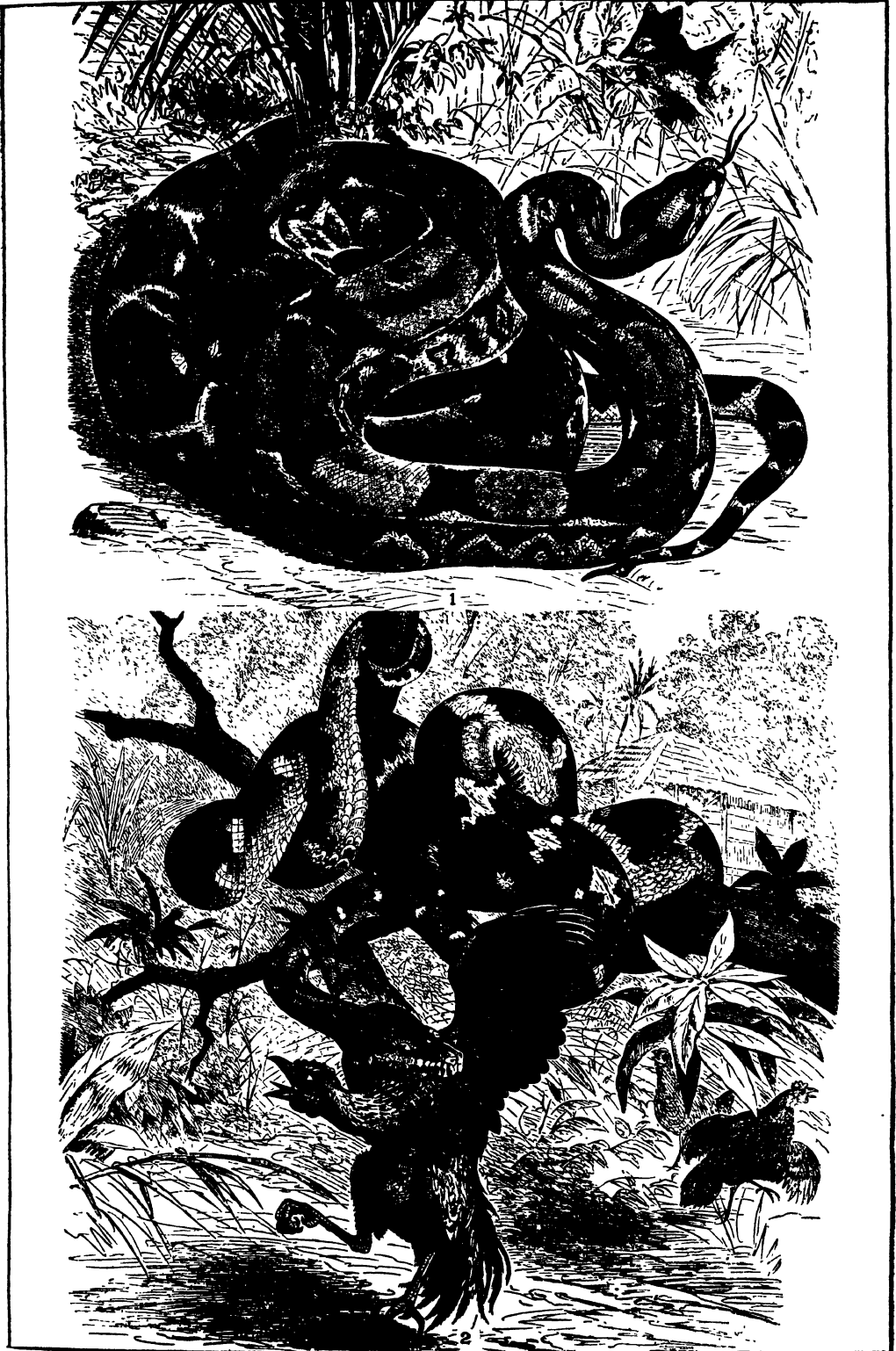
true boas also inhabit Madagascar. Of a closely related genus is the great water-boia, or anaconda (*Eunectes nuchinus*), which adds to the arboreal habits of the others the custom of crawling into the rivers and swamps of the half-flooded forests, where it lives, and there lying in wait for animals that come down to drink, or seizing those of semi-aquatic life. This is the largest, most formidable, and one of the handsomest of the tribe. Many species are of smaller size, down to only three feet in length, but all have similar habits. One genus (*Lichanura*) has a few species that dwell in the West Indies and Mexico, and are occasionally taken in Arizona and southern California; and small boas of this or an allied sort are frequently brought into the United States from Cuba, tightly coiled about bunches of bananas. They are harmless, of course, unless of a great size, having no poison sacs or fangs, and all the larger ones are susceptible of taming, and seem to acquire a positive regard for their human friends.

Boabdil, bō-ab-dēl', or **Abu-Abdullah**, ā'boo-abd-ool'ah, last Moorish king of Granada. He gained the throne in 1481 by expelling his father, Mulei Hassan; but being attacked by Ferdinand of Aragon, was defeated and taken prisoner. His father having resumed his crown, Ferdinand set Boabdil at liberty, and promised to assist him against his father, on condition of his agreement to become the vassal of Spain. He accepted the ignominious condition, and his father died of a broken heart. Boabdil was not permitted to reign in peace. By his tyranny he provoked the hostility of his own subjects, and Ferdinand, taking advantage of the dissensions which prevailed, laid siege to Granada. The Moors made a valiant defense, and were prepared to bury themselves under the ruins of the city, but Boabdil capitulated, and retired to a domain of the Alpujarras assigned him by the victor (1491). When on his way he turned round to take a last look of the city, and burst into tears. "Right, my son," exclaimed his mother, Aixa, who was standing by him, "weep like a woman for the throne which you had not the spirit to defend as a man and a king." The spot is still called "El Ultimo Sospiro del Moro" (the last sigh of the Moor). (See GRANADA.) Boabdil soon afterward passed into Africa, and fell in battle while assisting the king of Fez in an attempt to dethrone the king of Morocco.

Boadice'a, queen of the Iceni, a British tribe, inhabiting what are now the counties of Cambridgeshire, Suffolk, Norfolk, and Hertfordshire. She died about 62 A.D. The celebrated earthworks still extant, known as the Devil's ditch, at Newmarket heath, and at Six-Mile bottom, are supposed to be the fortifications of this tribe, and perhaps of this queen, against the Romans. She was a contemporary of Nero, and was a woman of remarkable character, both for firmness and ability. Her husband, the king of the Iceni, Prasutagus, dying, left Nero and his own two daughters joint heirs to his great wealth, hoping thereby to preserve his family and kingdom from the rapacity of the conquerors. But immediately on his death his kingdom was taken possession of by the Roman centurions. For some real or imaginary offense, the British queen was pub-



BOAS.



1. Boa Constrictor.

2. Dog-Headed Boa (*Xiphosoma Caninum*).

BOANERGES — BOAS

lily scoured by the executioner, and her daughters were abandoned to the lust of the slaves. Stung to frenzy by this outrage, taking advantage of the absence of Suetonius Paulinus, the Roman governor, from that part of England, Boadicea raised the whole military force of her barbarians, and bursting upon the Roman colony of London, reduced the city to ashes, and put to the sword in that and neighboring places,—of Roman citizens, traders, Italians, and other subjects of the empire,—at least 70,000 individuals. Suetonius lost not a moment in hurrying to the scene of action, although it was well known that the queen of the Iceni was in command of 120,000 men, which gradually increased to 230,000, according to Dion Cassius, while he could bring into the field in all less than 10,000 soldiers. It is true that absolute credit cannot be given to statements of prodigious numbers, such as the above, but at all events the disparity of force was extraordinary. The legion, posted on heights, where its flanks and rear were covered by woods, seems to have received the attack passively, sheltered from the missiles of the Britons by their large, oblong bucklers, until, when the darts and arrows of the barbarians began to fail, by one compact charge they carried all before them. They spared nothing; women, children, the beasts of burden, the dogs, were all cut to pieces. It is said that 80,000 Britons were butchered that day, while of the legions only 400 fell, and about as many more were wounded. It is believed that the action took place not far from St. Albans, Verulamium, a Roman colony, which at the first irruption had shared the fate of London. The queen, seeing that her cause was lost, committed suicide, rather than submit to the conqueror. Beaumont and Fletcher's play, 'Boadicea,' is founded upon the resistance made by Boadicea against Suetonius.

Boanerges, *bō-ā-nēr'jēz*, an appellation given by Christ to two of his disciples, the brothers James and John, apparently, on account of their fiery zeal. See Mark iii. 17.

Boar, Wild, a ferocious, swift-footed species (*Sus scrofa*) of wild swine, made dangerous by its extreme courage and superior strength. It is found in marshy forest-grounds of Europe, Asia Minor, and North Africa. The boar is much larger than the domesticated swine; and covered with short, grayish-black, woolly hair, thickly interspersed with stiff bristles, assuming the form of a crest along the spine. The great tusks of the lower jaw are formidable weapons in youth, but later becoming useless by curving over the snout, when the teeth of the upper jaw which protrude and curve out take their place as weapons. The boar seeks its food at night and feeds on roots, grain, and small animals, birds' eggs, etc. Besides this species, several others exist, notable among which are *Sus vittatus* of Asia and Africa, *Sus verrucosus* of Java, and the Celebes and *Sus barbatus* of Borneo. Boars were common in England until the time of Henry II., when they seemed to disappear for the time being, reappearing again in the reign of Charles I. Formerly the sport of hunting this animal with the aid of great dogs (boarhounds), was the favorite amusement of the nobles of France and Germany, but is now rarely followed except

in a few estates in eastern Europe, where the animal is preserved for the purpose. In India, however, the chase of the wild boars of that country, usually called "pig-sticking" is still foremost among the field-sports of the Anglo-Indians.

Board, the collective name applied to a number of persons having the management, direction, or superintendence of some public or private office or trust; often an office under the control of an executive government, the business of which is conducted by officers specially appointed, as board of admiralty, board of trade, etc.

Boardman, George Dana, American missionary: b. Livermore, Me., 8 Feb. 1801; d. 11 Feb. 1831. He studied at Andover and was ordained in the Baptist Church. In 1825 he went to Burma, where he labored assiduously in spreading Christianity. The mission planted by him became the central point of all Baptist missions in Burma.

Boardman, George Dana, American clergyman and author: b. Tavoy, British Burma, 18 Aug. 1828; d. Atlantic City, N. J., 28 April 1903; son of the American Baptist missionary of the same name. He was educated in the United States, graduating at Brown University in 1852, and at Newton Theological Institution in 1855. He was pastor at Barnwell, S. C.; afterward at Rochester, N. Y., till 1864, when he became pastor of the First Baptist Church in Philadelphia. In 1899 he established a lectureship at the University of Pennsylvania, known as the "Boardman Foundation in Christian Ethics." Besides sermons and essays, his chief works are: 'Studies in the Creative Week' (1878); 'Studies in the Model Prayer' (1879); 'Epiphanies of the Risen Lord' (1879); 'Studies in the Mountain Instruction' (1880); 'The Kingdom' (1899); 'The Church' (1901); 'The Golden Rule' (1901).

Boardman, Richard, English missionary: b. 1738; d. Cork, Ireland, 4 Oct. 1782. He became a member of Wesley's conference in 1763, and volunteered for service in America in 1769. He preached in New York and through the Middle States till 1774, and then, returning to England, continued his itinerant ministry. He is known as one of the founders of Methodism in the United States.

Boarfish, a fish of the family *Caproidæ*, found off the southern coast of Europe. The body is small, oval, compressed, and carmine in color, with seven transverse orange bands on the back, and has a long, hog-like snout.

Boarhound. See HOUND.

Boar's Head, The, a tavern in Eastcheap, London, destroyed in the great fire of 1666; its site is now occupied by a statue of William IV. The inn figures in Shakespeare's 'Henry IV.' and 'Henry V.' as the resort of Falstaff and his boon companions.

Boas, Franz, fränts bō'as, German-American ethnologist: b. Minden, Westphalia, 9 July 1858. He studied at Heidelberg, Bonn, and Kiel universities, 1877-82; traveled in the Arctic regions, 1883-4; was assistant in the Royal Ethnographical Museum in Berlin, and privat docent in geography at the University in 1885-6; and teacher of anthropology in Clark University,

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Worcester, Mass., in 1888-92. In 1901 he became curator of the American Museum of Natural History. He has spent much time among various American Indian tribes, and, among other works, has published 'Baffin Land' (1885); 'The Central Eskimo,' in the 'Annual Report' of the United States Bureau of Ethnology (1888); 'Indians of British Columbia' (1888-92); etc.

Boat, properly a small vessel propelled by oars or poles. Boats are made of iron, copper, India-rubber, gutta-percha, skins, and of all kinds of wood. Wooden boats are usually built either smooth or lap-streak, that is, where the upper plank laps over the next lower. Boats differ much in shape and size, depending on the use to which they are to be put. Launch is the largest boat carried by a man-of-war. Long boat, used by merchant vessels for conveying heavy burdens; this name is given to the largest boat, without regard to size. Cutter, shorter and lighter than the launch, and much faster. Jolly boat, smaller than the cutter, and not so fast, used for going on shore, usually rowed with four oars. Gig, a fast-rowing boat nearly the size of the cutter, employed both in the merchant service and navy. Barge, in the English navy, about the size of the cutter. This name is given to the large boats used on occasions of state. On the Mississippi it means a scow, flat-bottomed, and of very light draught. Sometimes also applied to the large 8- and 10-oared race boats. Pinnace, smaller than the barge, used for conveying light articles. In the English navy the pinnace launch is next in size to the launch. Paddle-box boat, so called from the place where they are stowed, commonly built like a whale boat, and smaller than the cutter. Whale boat, a sharp, light boat, very wide amidships, bow and stern alike, rowed with six oars. All surf boats are whale-boat model, or modifications of it. Dory, light, flat-bottomed, very sharp, with sloping sides, from 15 to 20 feet long, used very extensively in the fisheries. Wherry, in the United States, a dory; in England, a race boat for one rower, and from 15 to 30 feet long. Skiff, a little boat for crossing rivers, or going on shore from a vessel. Cobble, a small fishing boat, flat-bottomed. Punt, a flat-bottomed, decked boat, of very light draught, used chiefly by gunners. Shallop, small ship's boat; term not now used. Scow, a broad flat-bottomed boat, with square bow and stern, for conveying heavy weights, propelled by poles or sweeps, from 30 to 50 feet long, and 12 to 18 feet wide. Canal boat, a broad shallow boat, like the scow, except in having a keel and a rather sharper bow, used only on canals. Flats, flat boats, arks, etc., boats resembling scows, save in being decked. They are still to be found on the Mississippi and its tributaries, and are used for bringing all kinds of produce down the river. Bateaux, boats smaller than the scow, and used in the same way. Gondola, in the United States, a scow; properly, a very sharp, fast boat, sculled with one oar. Moses, large flats, used in the West Indies for taking molasses hogsheads from shore to ship. Felucca, a large boat with lateen sails, decked, and rowing from 10 to 16 banks of oars. Life-boats, boats used in storms for saving life. (See LIFE-BOAT.) Dingy, a wooden life-boat, carried by a man-of-war, has

wooden air-chambers at each end, and is about 18 feet in length. Waist boats and quarter boats take their name from the part of the vessel where they are kept, and are somewhat smaller than the cutter. Race boats differ very much in shape from any of those before named. Having only speed in view, they are built as light, narrow, and sharp as possible. They are rowed with from 2 to 12 oars, and are from 15 to 70 feet in length, and generally not more than eight inches above water. The two-oared boats are called shells, sculls, or wherries; the larger ones sometimes barges.

Boatbill, a South American heron (*Cancroma cochlearia*), having a remarkable bill, suggesting in its broad, inflated shape an up-turned boat, the keel of which is represented by the ridge of the culmen. The bird is about the size of a night-heron, but with shorter legs. Its general color is reddish-gray, with black and white markings. The back of the head and neck are covered with elongated, erectile feathers. A naked gular pouch hangs beneath the lower jaw. It feeds upon worms, crabs, and other small aquatic animals caught in muddy shallows. Another species (*Cancroma zelandom*) inhabits Central America.

Boat-fly (*Notonecta glauca*), an aquatic hemipterous insect which swims on its back; the hind-legs aptly enough resembling oars, the body representing a boat; hence the name. It frequents stagnant waters, swimming rapidly on the surface, but diving below whenever the water is disturbed. In color it is gray and black, with greenish elytra and white wings. The small insects which constitute its food are devoured in very large numbers. The female usually deposits the eggs on the stems and leaves of aquatic plants.

Boatswain Bird, or **Marlin Spike**, either of two species of a sea-wandering bird, so called because of the long, pointed feathers in its tail, which resemble a marlin spike, the boatswain's badge of office. One is the skua-gull (*Stercorarius parasiticus*), and the other a tropic bird (q.v.).

Bo'az, a wealthy Bethlehemite, who took upon himself the duty of providing for Ruth, as the near relation of her dead husband, Elimelech. From him Jesus Christ was directly descended.

Bob-white. See QUAIL.

Bo'bac, a European and Central Asian gregarious marmot (*Arctomys bobac*), resembling the American woodchuck in habits and appearance, but smaller.

Bobadilla, **Francisco de**, frān thēs'kō dē bō-bā-dēl'yā, Spanish soldier: d. 29 June 1502. In the year 1500 he was selected as a commissioner to enquire into the condition of the new Spanish colony of Hispaniola, and especially into the complaints which had been made against the administration of Columbus (q.v.). He was entrusted with unlimited powers, which he immediately exercised by arresting Columbus, putting him in chains, and sending him to Spain. He next abolished the regulations which had been enacted by Columbus, and indulged the colonists in all the excesses of power, and, above all, in boundless oppression of the natives. The unexpected outrage upon the most noted man of the time excited general

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indignation in Spain, and was regarded as a national dishonor. Orders were accordingly sent for the recall of Bobadilla, and when Columbus, now reinstated in his honors and emoluments, made his fourth landing in Hispaniola, the fleet bearing Bobadilla and other enemies of Columbus started for Spain. A fearful tropical hurricane wrecked the ships, and Bobadilla perished.

Bobbin, a reel or other similar contrivance for holding thread. It is often a cylindrical piece of wood with a head, on which thread is wound for making lace; or a spool with a head at one or both ends, intended to have thread or yarn wound on it, and used in spinning machinery (when it is slipped on a spindle and revolves therewith) and in sewing-machines (applied within the shuttle).

Bobbinet, a lace, with a hexagonal eyelet, manufactured by machinery, in imitation of the lace made on a pillow.

Bob'bio, Italy, a small town in the province of Pavia, the seat of a bishop, with an old cathedral, and formerly a celebrated abbey founded by St. Columbanus, in the library of which was a famous collection of manuscripts now divided between the Vatican and the Ambrosian Library at Milan. The population of the commune is about 5,000.

Boboli (bō'bō-lē) **Gardens**, the grounds of the Pitti Palace at Florence, planned in 1550 by Eleanora of Toledo. They contain many fine statues and the Isoletto fountain, designed by Jean de Bologne.

Bobolina, bō-bō-lē'nā, a heroic Greek woman; d. 1825. Her husband was put to death at Constantinople in 1812 by order of the Sultan, and Bobolina vowed revenge. At the beginning of 1821 she fanned the flames of insurrection among the Greek population in Turkey, equipped at her own expense three ships, herself taking command of one bearing her flag, as admiral, and giving the others to competent captains, while her two sons fought against the Turks on land. In September 1821 she attended the siege of Tripolizza, to meet the Peloponnesian leaders there assembled. She put her ships at the disposal of the government and maintained the blockade of Nauplia for 14 months, until the Turks were forced to capitulate. She then proceeded, with a small Greek fleet, which was entrusted to her charge, to the coasts of Morea, and during the siege of Monemvasia, when one of her nephews lost his life, she did not even waste one hour upon him, but quietly drawing a cloak over his body, avenged his death by continuing to bombard the city. After the war she lived with her brothers at Spezzia. In 1825 her house was attacked by the friends of a young lady who was supposed to have been dishonored by some member of her family, and she was killed by a rifle shot fired by one of the assailants.

Bob'olink, an oriole of the family *Icteridæ*, found in plains, prairie-lands, meadows, and cultivated fields throughout the entire United States, except on the Pacific coast. The male is 7.7 inches long, its tail taking up fully half of its length. It is distinguished from the black-birds and other orioles by its pointed tail-feathers, long middle toe, and variegated plumage. The male has two distinct sets of plumage, a summer or breeding dress, and a winter one.

The former dress is lustrous black, with the neck, scapulars, rump, and upper tail coverts buff, inclining to ochraceous on the neck, and ashy on the tail; the latter is similar to that of the female, who is protectively clothed in much-streaked yellowish-brown neutral tints; the young of both sexes also resemble her, until the young males reach maturity. The gay summer dress of the male, especially the black part, is due to the black margins upon the feathers that come in with the spring renewal of plumage. These edges wear away, and thus, as the season advances, the brownish centres of the feathers are gradually revealed. The song of the male is a varying melody, an incessant outpour of ecstatic music, in which one detects distinctly enunciated the word "bob-o-link." Its excited manners are as peculiar as its song, which often bubbles out of its beak as it flutters and dances in mid-air. As the summer advances and the plumage changes, the song diminishes, and finally ceases altogether.

Their nests consist of grasses neatly and skilfully entwined, and ingeniously hidden among the stems and leaves of plants, and are guarded carefully and most jealously by the male, whose exuberant pride in the four or five dull-white, flecked, and marbled eggs is remarkable. The bobolink goes in summer as far north as the banks of the Saskatchewan, but is most plentiful in the northeastern States, where it renders good service by the destruction of insects and their larvæ. It begins to migrate southward in August, and assembles in huge flocks in early autumn in the great wild-rice marshes that border Delaware and Chesapeake bays and their rivers, where they fatten on the wild rice, and are shot in vast numbers for market, under the name of "reedbird." Later in the season these birds advance southward and assail the cultivated rice plantations, where they are known as rice-birds and would ruin the crops, partly by eating, but mainly by breaking the stalks and shaking out the grain, were they not constantly killed or scared away by thousands, by men and boys who are employed to shoot them. On their return from the tropics in the spring they also attack the young plants. In consequence of this necessary persecution in the rice fields the species has been seriously diminished of late years, and bobolinks are becoming rare in many parts of the United States and Ontario. On account also of their beauty and powers of song, many are caught, caged, and sold in the bird-stores.

Bobruisk, bō-brōō'esk, Russia, a fortified town in the government of Minsk, on the right bank of the navigable Beresina, at its junction with the Bobruisk, 108 miles southeast of Minsk, with which it is connected by rail. By steam navigation it is connected with stations on the Dnieper and the Beresina. The chief exports consist of timber and grain. The place was fortified by Alexander I., and the defenses were extended by Nicholas I., who raised it to the position of a fortress of the first rank. In 1902 an extensive conflagration nearly destroyed the town. Pop. (1902) 26,000.

Bobs, a nickname given by English soldiers to Gen. Lord Roberts (q.v.).

Bocaue, bo-kow-ā, Philippines, a town in the province of Bulacan, Luzon, situated a few miles east of Manila Bay, near the city of Bulacan, and near the railroad line.

Boccaccino, Boccaccio, bōk-kāchō bōk-kāchē'nō, Italian painter: b. Cremona, 1460; d. 1518. Few details of his life are known. He came under the influence of Mantegna, and in his school in Cremona numbered Benvenuto Garofalo among his pupils. In 1497 he painted a series of frescoes in St. Agostino in his native city, but he is better known by his frieze in the cathedral. This represents the birth of the Virgin and various incidents in her life. Among his paintings are: 'Marriage of St. Catharine,' in the Venice Academy; 'Virgin and Two Saints,' in San Quirilo, Cremona, and a 'Holy Family,' in the Louvre, Paris. He committed suicide.

Boccaccio, Giovanni, jō-vā'n'ne bōk-kāch'ō, Italian novelist: b. 1313, in Paris or Florence; d. Certaldo, 21 Dec. 1375. His family was originally of Certaldo, but his father being engaged in commerce, removed to Florence, where he amassed wealth, and filled several important public offices. Very early in life Giovanni displayed a remarkable aptitude for learning, and before he was seven years old, composed verses with perfect facility. He was placed under the care of an eminent master, Giovanni da Strada, but his father having determined on a commercial career for his son, removed him from his tutor before his Latin course was completed, and as soon as he had acquired a sufficient knowledge of arithmetic apprenticed him to a merchant, with whom he remained six years. His master finding that he profited nothing, although he made in his company several commercial journeys, finally in despair sent him back to his father, and was accustomed to regard him as a very narrow-minded youth. His father discovering that his son would never make a merchant, thought that his studious habits might serve him in the legal profession. But the law proved as distasteful as commerce, and the father, finding that the law had little attraction for Giovanni, forced him to return to commerce, and fix his residence in Naples. The king, Robert of Anjou, a friend and patron of Petrarch, was greatly devoted to literature, and thus drew to his court the most eminent scholars of Italy. Boccaccio was well acquainted with Giovanni Barrili, a man of erudition, and Paolo of Perugia, the king's librarian, and excited by their example and encouragement, he entirely abandoned commerce and gave himself up to the pursuit of learning. His father gave his consent only on the condition that he should study the canon law, and although against his disposition, he applied himself to it for some time, took his doctor's degree, and after that found himself more at liberty to indulge his passion for poetry, while at the same time he devoted himself to the higher branches of philosophy, astrology, then a favorite study, and to the fathers of the Church. He remained eight years in Naples, and during his stay there was filled with desire of distinction by the visit of Petrarch on his way to Rome, where he had been decreed the honor of the laurel crown. Boccaccio marked with delight the splendid reception given to Petrarch, his examination of three days, his noble oration, and the applause which followed, but was far more pleased in after years to make the acquaintance of the illustrious poet, with

whom he formed a life friendship. Boccaccio was naturally fond of gay company, and fell in love with the princess Mary, illegitimate daughter of King Robert, and half-sister of the celebrated Joanna of Naples. She was married to a Neapolitan gentleman, but at once ardently returned Boccaccio's love and became his avowed mistress. At her instance, he composed his romance of 'Il Filocopo,' and 'L'Amorosa Fiammetta,' in the latter of which his lady, under the name of Fiammetta, bewails the loss of Pamphilo, supposed to represent himself. The 'Filocopo' is not skilfully constructed, and is filled with spectres and visions of every kind, and the powers of darkness are summoned before the reader to account for its scenes and incidents. Yet it contains passages of that wondrous grace and vivacity afterward so signally displayed in the 'Decamerone,' and touches of human nature in which the whole character is pictured in a single sentence. While thus employed at Naples he was suddenly summoned to Florence by the illness of his father. His separation from the princess Mary appears to have affected both lovers with violent sorrow, and it was only by the composition of the romance of 'Ameto' that he could console himself during his absence. His father's recovery and marriage set him again at liberty to return to the favors of his adored princess. He was not only happy from his connection with the princess Mary, but possessed the favor of Acciajuoli, who had great power in Naples, and even the regard of Queen Joanna herself. It is asserted on respectable authority that many of the most licentious passages in the 'Decamerone' were written in conformity with the taste and by the command of the queen. His father died in 1350, leaving a son by his wife Bice dei Bosticchi, who was also dead, to the care of Boccaccio. The poet faithfully attended to his trust, and becoming acquainted with Petrarch, the latter's example and influence began very shortly to act upon the mind of his younger friend, who from the date of their friendship commenced to turn his thoughts more from licentious pleasures to purer fame. Being now permanently settled in Florence, Boccaccio, by Petrarch's advice, began to take some interest in the affairs of state. His motives were appreciated, however, and he was sent on an embassy to Padua, to invite Petrarch to accept the presidency of the university. Several other missions followed, and in April 1353, he took part in one to Pope Innocent VI., the papal court then residing at Avignon. In the same year was published his 'Decameron' or '10 Days' Entertainment,' one of the most extraordinary works of genius ever written, and which after the lapse of five centuries is still regarded as one of the purest specimens of Italian prose, as an inexhaustible repository of wit, beauty, and eloquence, although unhappily deformed with licentious descriptions. While occupied with these popular compositions, Boccaccio did not lose sight of higher pursuits in literature. Like Petrarch he was a devoted collector of ancient manuscripts, and a diligent student of the classics. On one occasion Boccaccio visited Monte

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Cassino, within whose monastery he knew many works had been collected, which had escaped the ravages of the barbarians, but found, to his amazement, that they were suffered to rot in a damp loft exposed to the weather, and that frequently when the monks were in want of money, they took some of the manuscripts, obliterated the writing, replaced it by copying on the parchment some part of the ritual, and then sold the new productions among the people of the neighborhood. To such collectors as Petrarch and Boccaccio, and to the latter pre-eminently, the world owes a debt of gratitude for the rescue of many of the great classic works which otherwise would have been irretrievably lost. In 1359 the author of the Decameron visited Petrarch at Milan, conversed with him, as he informs us, at great length on the subjects of morality and religion, and determined to devote himself more seriously to holy studies. This resolve received additional stimulus in 1362 from a singular circumstance. A monk from the Carthusian monastery at Sienna came to visit him, saying that he was charged with a message to him from Father Petroni, who on his death-bed, although he had never seen Boccaccio, declared that he knew him in spirit, and commissioned the monk to exhort him to repentance. In order to prove the truth of his words, the monk told Boccaccio of a circumstance in his life which the poet thought known only to himself. So great was the effect of this warning, that he determined to abandon poetry, sell his library, and lead a life of penance and meditation. With this view he wrote to Petrarch, supposing that his sudden purpose would meet with kindred enthusiasm, but his friend answered in a strong, common-sense letter, instructing him to receive the warning to repentance, but informing him that there was no necessity for selling his books or abandoning his studies. Boccaccio accordingly wrote in a strain altogether free from his former one, while he assumed the ecclesiastical habit, and applied himself to theology. With disinterested generosity a large part of his means was dissipated in the collection of Greek manuscripts, his emissaries visiting many parts of Europe to procure them. His fortune was thus gradually impaired, and toward the decline of life he found himself poor and deserted by all his friends, except the noble-minded and constant Petrarch. That great poet wished his friend to take up his abode with him, but Boccaccio preferred independence, and declined the offer, although he visited Petrarch whenever he found an opportunity. In 1363 he was invited to Naples by the grand seneschal Acciajuoli, but was so hurt by his cold reception, that he soon left and went to Venice to meet Petrarch. On returning to Florence he found its turbulent state of society in little accordance with his wish of retirement, and took up his abode in a little cottage in Certaldo, in the vale of Elsa, dear to him as the birthplace of his family. From this retreat he was soon summoned by the chief citizens of Florence, to undertake an embassy to Urban V. at Avignon, and repairing to the papal court he experienced the most flattering reception. He was again sent

to Urban in 1367, after the pontiff had removed to Rome, when the character of Boccaccio had so completely changed from his former looseness, that he was characterized by the bishop of Florence as one in whose purity of faith he had the utmost confidence. He was now honored by the Florentine magistrates with a professorship founded in memory of Dante, for the better explication of the 'Divina Commedia.' His lectures commenced in October 1373, and continued until his death, which was doubtless hastened by the demise of Petrarch 10 months before his own. In eloquent language he bewailed his loss. Boccaccio wrote numerous works in Italian and Latin, and both in prose and poetry, few of which are referred to at the present day; his great fame rests upon the Decameron. In these hundred tales of love, displaying the most wondrous fertility of invention, the reader is perpetually delighted with the beauty of the narrative and the variety of the scenes, whether of intrigue, wit, or pathos—no two stories, nor even their introductions, resembling each other. The author's fondness for involving friars in every imaginable scene of mischief and ludicrous mishap, created great scandal to the Church, and his famous romance, the tenth novel of the sixth day, in which "Friar Onion promises some country people to show them a feather from the wing of the angel Gabriel, instead of which he finds only some coals, which he tells them are the same that roasted St. Lawrence," drew down the solemn anathema of the council of Trent. The editions of the Decameron are almost innumerable, and translations exist in all the languages of Europe. The earliest editions are extremely rare, and of that of Valdarfer in 1471, only one copy is known. Boccaccio's poem, 'Il Teseide' is written in the *ottava rima*, of which he is usually considered as the inventor, and is the first Italian poem which presents a specimen of the epos. Chaucer borrowed from this poem his "Knight's Tale," and Shakespeare a part of his 'Midsummer Night's Dream.' The great English dramatist has also, in some measure, availed himself of Boccaccio's Decameron, as in 'Cymbeline' and 'All's Well that Ends Well.' With all his faults, we may consider Boccaccio one of the great revivers of learning and a benefactor to mankind, as well as worthy of the third place in that great triumvirate with Dante and Petrarch, "which renders the 14th century so splendid an epoch in the history of literature." See Cochin, 'Boccaccio, études italiennes' (1890), Symonds, 'Giovanni Boccaccio as Man and Author' (1895).

Boccage, Marie Anne Fiquet du, mã-rê ân fê-kâ dü bôk-kâzh (LE PAGE) French poetess: b. Rouen, 22 Nov. 1710; d. there, 8 Aug. 1802. She was educated in Paris, in a nunnery, where she discovered a love of poetry. Her first published work, a poem on the mutual influence of the fine arts and sciences, appeared in 1746, and gained the prize from the Academy of Rouen. She next attempted an imitation of 'Paradise Lost,' in six cantos; then of the 'Death of Abel'; next, a tragedy, 'The Amazons'; and a poem in 10 cantos, called 'The Columbiad.'

Madame du Boccage was praised by her contemporaries with an extravagance for which only her sex and the charms of her person can account. *Forma Venus, arte Minerva*, was the motto of her admirers, among whom were Voltaire, Fontenelle, and Clairaut. There is a great deal of entertaining matter in the letters which she wrote on her travels in England and Holland. She was a member of the academies of Rome, Bologna, Padua, Lyons, and Rouen. Many of her works have been translated into English, Spanish, German, and Italian.

Boccanera, Simone, sē-mō'nā bōk-kā-nā'rā, first doge of Genoa: d. 1363. He was born of an illustrious noble family, but early took part with the democratic party and gained great popularity by undertaking the defense of the people against the nobles. During a commotion caused by the severity with which Philip of Valois had punished a mutiny on board some Genoese galleys in the service of France, the people wished to appoint Boccanera their abbé, an office which appears to have been similar to that of the tribunes at Rome. Boccanera declined to accept, on the ground that his noble birth would not allow him to become a plebeian magistrate. The excuse only made the people more determined to place him at their head and as he would not be abbé they by acclamation hailed him doge. The office, thus introduced into Genoa for the first time in 1339, was exercised by Boccanera till 1344, when the ascendancy of a faction opposed to him obliged him to abdicate and retire to Pisa. He afterward regained the office in 1356, and had held it for seven years, when his enemies succeeded in destroying him by poison.

Boccherini, Luigi, loo-ē'jē bōk-kā-rē'nē, Italian composer of instrumental music: b. Luc-ca, 14 Jan. 1740; d. Madrid, 28 May 1805. He received his first instruction in music and on the violoncello from his father and the Abbé Vanucci, music-master of the archbishop. He further improved himself in the art at Rome, and afterward went, with Filippo Manfredi, his friend and countryman, to Spain, where he met with but indifferent patronage, and latterly suffered greatly from indigence. Previous to 1797 the king of Prussia, Frederick William II., who was a great lover of the violoncello and admired Boccherini's compositions, had paid him a pension on condition of his sending him yearly some of his quartets and quintets. The compositions which Boccherini published himself consist of symphonies, sestets, quintets, quartets, trios, duets, and sonatas for the violin, violoncello, and pianoforte. He never composed anything for the theatre; and of church compositions we find but one, his 'Stabat Mater.' The adagios of Boccherini excited the admiration of the connoisseurs and the despair of the composers of his time. He may be regarded as a sort of minor Haydn, and he was the first who wrote instrumental quartets, of which all the parts are *obbligato*, and determined the true character of this species of music. His melodies are more highly esteemed in England, France, and Spain than in Germany.

Bocchetta, bōk-kēt'tā, Italy, a pass of the Apennines, leading from Lombardy to Genoa, and traversed by the road from Novi. In the Austrian war of succession (1746-7), and in the

French wars toward the end of the 18th century, it was the scene of several important events.

Bocconia, or Plume Poppy, a genus of four or five species of plants of the natural order *Papaveraceae*. *P. cordata*, a native of Japan and China, is the only species of special merit. It is a hardy perennial herb with large leaves similar to those of bloodroot, and small usually pinkish apetalous flowers borne in large terminal panicles rising like spires from four to eight feet above the dense foliage. Where known, it is a favorite in borders and shrubberies and is also largely used upon lawns for its remarkable appearance. It is very much sought by bees, and should prove a valuable bee-forage, since it will thrive almost anywhere. It is readily propagated by seeds, divisions of the root, and by suckers. If set in rich soil the plants will attain the greatest size and attractiveness.

Bochart, bō-shār, Samuel, French divine: b. Rouen, 1599; d. Caen, 16 May 1667. He was son of a Protestant minister descended from an illustrious family, and gave proof of precocious talents by composing, at the age of 14, a Greek poem in praise of his master, Thomas Dempster, who was so much pleased with it that he published it at the head of his work on Roman antiquities. He afterward studied philosophy and theology at Sedan, visited England and Leyden, and, returning to France about 1628, became Protestant minister of Caen, a post which he held till his death. Shortly after, a Jesuit of the name of Veron, who had been specially trained to controversy, and had received a diploma entitling him to travel the country and debate the points of difference between the Protestant and Roman Catholic churches, challenged Bochart to a discussion. It took place in 1629, in the castle of Caen, in presence of the Duc de Longueville, governor of Normandy, and a large assemblage of nobility and gentry, and had continued for 11 days, when Veron, without waiting to bring it to a close, judged it prudent to take his departure. The debate was published by Bochart under the title of 'Actes de la Conférence Tenue à Caen.' His next work, entitled 'Geographia Sacra seu Phaleg et Chanaan,' added so much to his reputation that Christina, queen of Sweden, sent him a letter in her own hand, inviting him to Sweden. He accepted the invitation, and had for his traveling companion the celebrated Huetius, afterward Bishop of Avranches, and author of an excellent work on the Christian evidences, entitled 'Demonstratio Evangelica.' On his return to Caen in 1653 he learned that an academy had been founded there in his absence. He immediately joined it, and was afterward one of its most distinguished members. Bochart's next great work is entitled 'Hierozoicon, or an Account of the Animals mentioned in Scripture.' It was scarcely completed when its distinguished author, while addressing the academicians of Caen, was struck with apoplexy and died almost instantaneously. His health had previously given way under grief for the loss of a daughter, his only child. Besides the works above mentioned, he wrote several others, among which is a 'Letter to Dr. Morley,' written, it is said, at the request of King Charles II., and discussing three important questions—De Presbyteratu et Episcopatu; De Provocatione a Judiciis Ecclesiasticis; De

Jure et Potestate Regum. Bochart's principal works are still standards on the subjects of which they treat.

Bochnia, bōh'nē-ā, Austria, a town in the government of Lemberg, Galicia, near the Raba, 25 miles east-southeast of Cracow. It is tolerably well built, with several churches, a gymnasium, a grammar and other schools, and a board for the regulation of mines and saltworks. The salt mines here employ 500 persons, and yield 15,000 tons per annum. Pop. about 9,000.

Bochum, bōh'oom, Prussia, a town in the government of Arnsberg, province of Westphalia, five miles east-northeast of Essen and between 20 and 30 miles northeast of Düsseldorf. It is on the railway from Dortmund to Duisburg, and has manufactories of iron, steel, hardware, carpets, tobacco, etc. Pop. (1895) 65,980.

Bock, Karl Ernst, German anatomist: b. 1809; d. 1874. At the outbreak of the Polish revolution he went to Warsaw, where he acted as hospital physician, first in the Polish service and later in the Russian. On his return home he was elected extraordinary professor in the University of Leipsic. His title to fame rests chiefly on his 'Handbook of Human Anatomy.'

Bock Beer, a strong beer, the first drawn from the vats in the spring, when the winter's brew of lager beer is broached. So called on account of the German legend which affirms that, in a competitive trial of the strength of beers brewed by two rival brewers, in which each drank the product of the other, the defeated candidate declared that it was not the beer of his rival which had made him unsteady on his legs and overthrew him, but a young he-goat (*bock*) which some children were chasing and which ran against him and overturned him. As the *bock* was blamed for his fall (although many suspected the beer) that particular variety of beer has been named bock beer in commemoration of the occurrence.

Böcklin, bērk-līn, Arnold, German painter: b. Basel, 16 Oct. 1827; d. 1901. He studied at the Düsseldorf Academy and also at Brussels, Paris, and in Italy, devoting himself mostly to landscape painting. A contract to decorate the dining-hall of a villa summoned him to Hanover; in 1856 he went to Munich, where Count Schack became his patron. In 1858 he became teacher in the art school at Weimar; in 1866-71 he was in Basel; in 1871 he returned to Munich and lived also in Zurich and Florence. He is in the first rank of landscape painters, showing a real poetic power and wealth of coloring, yet his most poetical conceptions in landscape painting are often marred by the figures introduced. Among his most notable paintings are 'Venus Reposing'; 'Pan in the Rushes'; 'Castle by the Sea Surprised by Corsairs'; 'Villa by the Sea'; and 'The Isle of the Blessed.'

Bocland, Bockland, or Book-land, one of the original English modes of tenure of manorland which was held by a short and simple deed under certain rents and free services. This species of tenure has given rise to the modern freeholds.

Bocskey, böch'kō-e, Stephen, Hungarian national leader: b. 1556; d. 1606. In 1604, when the Emperor Rudolf II. attempted to suppress

Protestantism in Hungary, a rebellion broke out, and Bocskey joined the malcontents and became their leader. He was well supported by the people, drove back the emperor's troops, and was made Prince of Transylvania. In 1606 he concluded the Peace of Vienna with the emperor, and this secured religious freedom to Hungary for a long time.

Bode, Johann Elert, yō'hän ā'lert bō'da, German astronomer: b. Hamburg, 19 Jan. 1747; d. 23 Nov. 1826. He gave the first public proof of his knowledge by a short work on the solar eclipse of 5 Aug. 1766. The approbation which this received encouraged him to greater labors, and in 1768 appeared his 'Introduction to the Knowledge of the Starry Heavens' (9th ed. 1822). In 1772 the Berlin Academy chose him their astronomer, and 10 years afterward he was made a member of that institution. His best works are his 'Astronomical Almanac' (commencing 1774).—a work indispensable to every astronomer,—and his large 'Celestial Atlas' in 20 sheets, in which the industrious editor has given a catalogue of 17,240 stars (12,000 more than in any former charts). In 1825 he was released, at his own wish, from his duties in the Academy of Science and the observatory in Berlin. His place was filled by Professor Encke. His empirical law as to the distance of the planets is well known. See BODE'S LAW.

Bode's Law, an empirical law formulated by the German astronomer Bode (q.v.) to give the arithmetical relation subsisting between the distances of the planets from the sun. It may be thus stated: Write, in the first instance, a row of fours, and under these place a geometrical series beginning with 3, and increasing by the ratio of 2, putting the 3 under the second 4; and by addition we have the series 4, 7, 10, etc., which gives nearly the relative distances of the planets from the sun.

4	4	4	4	4	4	4	4	4	4
3	6	12	24	48	96	192	384		
4	7	10	16	28	52	100	196	388	

Thus, if 10 be taken as the distance of the earth from the sun, 4 will give that of Mercury, 7 that of Venus, and so forth. The actual relative distances are as follows, making 10 the distance of the earth:

Mercury	Venus	Earth	Mars	Asteroids	Jupiter	Saturn	Uranus	Neptune
3.9	7.2	10	15.2	27.4	52.9	95.4	192	300

Close as is the correspondence between the law and the actual distances, no physical reason has been given to account for it, although there is little room for doubt that such exists. Kepler was the first to perceive the law, and Bode argued from it that a planet might be found between Mars and Jupiter, to fill up the gap that existed at the time in the series. The discovery of the planetoids has proved the correctness of this prediction.

Bodenstedt, Friedrich Martin von, frē'drīh mār-tēn fōn bō'dēn-stēt, German poet and miscellaneous writer: b. 1819; d. 1892. He studied at Göttingen, Munich, and Berlin, and became tutor to the young Prince Gallitzin at Moscow. Having obtained an educational appointment at Tiflis he published a work on the peoples of the Caucasus (1848), and 'A Thou-

sand and One Days in the East' (1849-50), which were very successful. In 1854 he was appointed professor of Slavic at Munich, and in 1858 was transferred to the chair of Old English. He subsequently was theatrical director at Meiningen, and traveled and delivered lectures in the United States. Among the best of his poetical works are the 'Songs of Mirza-Schaffy,' purporting to be translations from the Persian, but really original, which have passed through more than 150 editions. He published translations from Marlowe, Ford, Webster, and other contemporaries of Shakespeare, translated Shakespeare's 'Sonnets,' and with other writers joined in a new translation of Shakespeare's dramatic works (1866-72, 9 vols.).

Bodie, or **Body's Island**, an island of sand between the Atlantic Ocean and Albemarle and Roanoke sounds. The sand shifts often, and inlets from the ocean appear and disappear. There is a lighthouse with a first-class light on the island.

Bodieron, bō-dī-ēr'ōn, a fish (*Hexagrammus lagocephalus*) of Puget Sound, similar to the rock-trout (q.v.), but having greenish-colored flesh.

Bodin, **Jean**, zhōn bō-dān, French political writer: b. Angers, 1529 or 1530; d. Laon, 1596. He studied law at Toulouse; delivered lectures on jurisprudence there, and afterward went to Paris and practised. Being unsuccessful in his profession, he turned his talents to literary labors; was invited by Henry III. to his court; and afterward traveled with the king's brother, Francis, Duke of Alençon and Anjou, to Flanders and England, where he had the gratification of hearing lectures in Cambridge on his work, 'De la République,' originally written in French, but afterward translated by Bodin himself into Latin. He died of the plague.

Bodkin, **Matthias M'Donnell**, Irish novelist and journalist. He has written 'Poteen Punch'; 'Pat o' Ninc Tales'; 'The Rebels'; 'White Magic'; etc.

Bod'kin, (1) an instrument used by women of ancient times to fasten the hair, worn at the back of the head; (2) a sharp instrument for piercing holes in cloth; (3) a blunt instrument with an eye, for drawing tape, etc., through hems; (4) a small tool used by printers.

Bodle, a copper coin formerly current in Scotland, of the value of two pennies Scotch, or the sixth part of an English penny. It is said to have been so called after a mint master named Bothwell.

Bodleian (bōd-lē'an) **Library**, the public library of the University of Oxford, so called from Sir Thomas Bodley (q.v.) who restored it toward the close of the 16th century, many of the previous collections of books and manuscripts having been destroyed during the reign of Edward VI. Beside restoring the building and providing a fund of \$10,000 for the purchase of books, he also presented a collection which was valued at \$50,000, and left an estate for the maintenance of officers and for keeping the library in repair. For the government of the library he drew up some statutes, which were afterward incorporated with those of the University. The library was first opened to the public 8 Nov. 1602. The liberal example of Bodley was soon followed by the Earl of Essex, who

presented part of the Portuguese bishop Osorius' library, which had been captured by Essex in 1596, shortly after the expedition against Cadiz. After the death of Bodley, the Earl of Pembroke added a valuable collection of Greek manuscripts procured by Baroccio, a Venetian. At later dates Sir Thomas Roe, Sir Kenelm Digby, the "learned Selden," Gough the antiquary, and Archbishop Laud, made donations of valuable Greek, Oriental, and German manuscripts to this magnificent library. The library of the Hebrew scholar Oppenheim, rich in rabbinical lore, a great collection of Eastern manuscripts, of early editions of the Bible, original editions of ancient and classic authors, together with 50,000 dissertations by members of foreign universities, and an extensive collection of medals, coins, prints, etc., were also subsequently deposited in this library. In 1809, Clarke, the traveler, gave to it some rare Greek and Latin manuscripts, including a 'Plato' from the Isle of Patmos. In 1818 an exceedingly valuable collection of Hebrew, Greek, and Arabic manuscripts procured from Venice, was added, together with a portion of the famed library of Richard Heber (1834), and lastly, the rare books, manuscripts, and coins of the scholar, antiquary, and Shakespearean commentator, Francis Douce. This renowned library, in fine, is rich in many departments in which other libraries are deficient, and forms altogether the noblest collection of which any university can boast. It is constantly increasing by donations, by copies of every work printed in the United Kingdom, as well as by books purchased from the fund left by Bodley, by fees received at matriculation, and by an annual payment of all persons (servitors excepted) who have the right of admission to the library. It is now estimated to contain upward of 500,000 bound volumes, and between 30,000 and 40,000 manuscripts. The first catalogue of the printed books was issued by Dr. James in 1605.

Bodley, **Sir Thomas**, English scholar, and founder of the Bodleian Library (q.v.) at Oxford: b. Exeter, 1544; d. London, 1612. He was educated partly at Geneva, whither his parents, who were Protestants, had retired in the reign of Queen Mary. On the accession of Elizabeth they returned home, and he completed his studies at Magdalen College, Oxford. He afterward became a Fellow of Merton College, and read lectures on the Greek language and philosophy. He went to the Continent in 1576, and spent four years in traveling. He was afterward employed in various embassies to Denmark, Germany, France, and Holland. In 1597 he returned home and dedicated the remainder of his life to the re-establishment and augmentation of the public library at Oxford. This he accomplished, procuring books and manuscripts himself, both at home and abroad, at a great expense, and by his influence and persuasion inducing his friends and acquaintances to assist in his undertaking. Sir Robert Cotton, Sir Henry Savile, and Thomas Allen the mathematician, were among the principal contributors on this occasion. The library was so much augmented that Sir Thomas Bodley, who was knighted at the accession of James I., was induced to erect an additional structure for the reception of

the increasing quantity of valuable books and manuscripts. He was interred in the chapel of Merton College, in the university. He bequeathed nearly the whole of his property to the support and augmentation of the library. See 'Reliquiæ Bodleianæ' (London, 1703).

Bodmer, Georg, gā-orh böd'mār, Swiss mechanic: b. Zürich, 6 Dec. 1786; d. Zürich, 29 May 1864. He invented the screw and cross wheels; and made valuable improvements in firearms and in various kinds of machinery, particularly in that of wool-spinning.

Bodmer, Johann Jakob, yō'hān yā'kōb, German poet and scholar: b. Greifensee, near Zurich, 19 July 1698; d. Zürich, 2 Jan. 1783. Although he produced nothing remarkable of his own in poetry, he helped to open the way for the new German literature in this department, which was then in a low and barbarous state. He was the antagonist of Gottsched in Leipsic, who aspired to be the literary dictator of the day, and had embraced the French theory of taste, while Bodmer inclined to the English. He has the honor of having had Klopstock and Wieland among his scholars. Bodmer was for a long time professor of history in Switzerland. He was a copious and indefatigable writer, though he entertained many incorrect views.

Bodoni, Giambattista, jām-bāt-tēs'tā bō-dō'nē, Italian printer: b. Saluzzo, Piedmont, 1740; d. Padua, 29 Nov. 1813. His father owned a printing establishment at Saluzzo, and he began, while yet a boy, to employ himself in engraving on wood. His labors meeting with success, he went in 1758 to Rome, and was made compositor for the press of the Propaganda. By the advice of the superintendent he made himself acquainted with the Oriental languages, in order to qualify himself for the kind of printing required in them. He made himself of great service to this press by restoring and putting in place the types of several Oriental alphabets which had fallen into disorder. The Infante, Don Ferdinand, about 1766, had, with a view of diffusing knowledge, established a printing-house in Parma, after the model of those in Paris, Madrid, and Turin. Bodoni was placed at the head of this establishment, which he made the first of the kind in Europe, and gained the reputation of having far surpassed all the splendid and beautiful productions of his predecessors in the art. The beauty of his type, ink, and paper, as well as the whole management of the technical part of the work, leaves nothing for us to wish; but the intrinsic value of his editions is seldom equal to their outward splendor. His Homer is a truly admirable and magnificent work; indeed, his Greek letters are the most perfect imitations of Greek manuscript that have been attempted in modern times. His splendid editions of Greek, Latin, Italian, and French classics are highly prized. He was a member of several academies of Italy and knight of several orders.

Body and Mind, in philosophy, the problems of the reality of mind and body, and of

the relations conceived to exist between them. Mind and body, positing temporarily their reality, may first be regarded from the point of view of correlated action. Generally experience reveals indisputably the intimate relation which exists between the constitution and modifications of bodily functions and the character and alterations of consciousness. Consider the following: the dependence of certain forms of consciousness upon the functioning of the senses; modifications due to injury by a blow, or lesion in the cerebral cortex; effect of loss of sleep upon attention; effect of the use of certain drugs; pleasures and pains resulting from functioning of sense; feeling of effort which accompanies bodily work; the phenomena of sleep; diseases of memory and will, double personality; phenomena of hypnotism, hallucination, etc.; the evidence from heredity, sexual differences, and other allied phenomena. All these, as facts, afford an indisputable conclusion concerning the correlated action of mind and body.

But difficulties arise as soon as we undertake to state the nature of the relations which exist between them. The general truth which the phenomena referred to appear to establish, that every psychosis has its concomitant neurosis and every neurosis a concomitant psychosis, is not entirely borne out in fact. The former part of the statement is indubitable; the latter by no means so. Mental activity always involves nervous activity, but the nervous system does work other than that connected with mind. Moreover the precise interconnections of mental fact with cerebral fact, and *vice versa*, is not only not known, but the specific character of the neurosis concomitant with the psychosis is perhaps impossible of final analysis. But until these phenomena are understood, the nature of the relations of body and mind cannot be finally determined. However, physiological psychology has successfully established certain general conclusions concerning the existence of uniform relations between concomitant psychical and neural processes. The most obvious of these is the time-order or synchronous occurrence of the two series of events. The remainder are concerned, in the main, with variations of intensity, quality, combination, and complexity. Qualitative psychical differences, however, are not accompanied by corresponding differences of molecular movement. These are quite different from the corresponding sensational differences.

Philosophical systems, from the days of Greek thought (see ANAXAGORAS; ARISTOTLE) down to the present, have taken up the problem where psychology leaves off. These systems may be divided into dualism and monism. According to dualism, the first and crudest theory of which was promulgated by Descartes, both mind and body are real existences, and their relations must accordingly be determined. The problem assumes two forms, the epistemological and the genetic. According to the former of these a knowledge of both body and mind is posited. Various theories concerning their interaction then arise, such as the causal relation, parallelism, pre-established harmony, and occasionalism. The first of these is not only the most important, but the philosophical conceptions concerning it may be said to strike

at the inmost heart of the problem, and their assumption determine the acceptance or rejection of general theories. Physiological psychology has demonstrated the temporal concomitance of the psychosis with the intermediate central portion of the neurosis. But we have certain neuroses revealing physiological processes devoid of conscious concomitant. Now, the question arises: How may this partial parallelism be accounted for? Is there a causal relation such as our initial phenomena seemed to indicate, or have we only the appearance of it in a general parallelism? Science has failed to afford precise answers to these questions. According to it the series of nervous events is complete in itself and self-sufficient. Hence, since antecedent events fully account for consequent ones, consciousness can have no causal action upon the neural series. Consciousness, then, is a mere accident and without determining power in any series. This gives us the doctrine of human automatism, according to which all our nervous actions are determined, and consciousness is an unnecessary attachment. On the other hand, others regard psychical phenomena as having a reality equal to that of physiological phenomena. They acknowledge, generally, the conditioning effect of nervous processes upon mental ones, but they divide again on the question of the reality of causal connection. Finally the genetic view traces its distinction of mind and body upon the dualism which a developmental theory in general appears to demand; or it accepts it as an hypothesis, uncritically examined, but convenient for practical purposes.

It is the attempted unification of mind and body which brings us to the doctrine of monism. Under this general theory we find spiritual monism, materialism, panpsychism, epiphenomenon, mind-dust, etc. The most obvious means of reconciliation is that of resolving either one of the ultimate factors into the other. The metaphysical conception of materialism is the doctrine by which all substance whatsoever is conceived of as being reduced to matter, of which conscious mind is but a product. The chief objections urged against it are: (1) that it makes our mental states, which of all knowledge we know most immediately and directly, subordinate to our indirect and inferential knowledge of things; (2) that consciousness is a reality distinct from material phenomena, and therefore incapable of being analyzed into it; and (3) that no external world is possible apart from a perceiving subject. Spiritualism, on the other hand, escapes these objections by positing mind as the primordial substance, and further regarding material things as in themselves essentially expressive of spirit. It encounters, however, certain difficulties in the concomitance and juxtaposition of its elements for which, as yet, it has afforded no adequate solution.

According to Spinoza's doctrine of monism, both spirit and matter, or the mental and the material, are posited as real, self-existent realities, but not standing independent of each other. There is a common "substance," and in this, consciousness and extension, the fundamental attribute of external reality, find themselves connected. Hence the doctrine is neither purely materialistic nor purely spiritualistic, but in-

cludes both these theories. The parallelism which physiological psychology demonstrates, then, in the two classes of phenomena, indicates not only their ultimate inseparability, but the fact that they are but different modes of manifestation of a common substance. Manifestly, then, this doctrine calls for no interaction theory and disposes of the troublesome question of causal connection above referred to. There is no interaction, merely a parallelism. This parallelism, indeed, extends throughout all material objects, all of which thus assume a certain *mental* aspect also. It is at this point especially that monism parts company, in its speculation, from the teachings of non-speculative psychology, according to which mind and consciousness are invariably co-extensive.

Bibliography.—Bain, 'Mind and Body'; Hötting, 'Psychology,' II.; Ladd, 'Elements of Physiological Psychology,' Pt. III.; Wundt, 'Physiological Psychology,' c. XXIV.; Wentscher, 'Physische und Psychische Kausalität' (1896); Rehmke, 'Aussenwelt und Innenwelt' (1898); 'Psychological Review,' III. (1896).

Body Color, a term applied to such pigments as have body enough to be opaque, as distinguished from those which are transparent. As a rule, pigments have more body the nearer they approach to white; consequently the light parts of pictures in oil are in body color to give them brightness and strength, while the dark parts are transparent to give them depth. Water color painting, when executed by mixing the pigments with water after the manner of an oil painting, is said to be painted in body color.

Body-snatching. See CORPSE.

Boece, *bois*, **Boeis**, or **Boyce**, **Hector**, Scottish historian: b. Dundee, about 1465; d. 1536. The family surname probably corresponds with the modern Boyce. Boece studied first at Dundee, and then at the University of Paris, where he took the degree of B.D., and became professor of philosophy in the College of Montaigu. Here he became acquainted with Erasmus, who professed a high esteem for him. About 1500 Boece quitted Paris to assume the principalship of the newly founded University of King's College, Aberdeen. He was also made a canon of Aberdeen. The death of his patron in 1514 occasioned his first work—a history of the prelates of Mortlach (the original see) and Aberdeen, including the life of Bishop Elphinstone, which occupies about a third of the volume. It has been reprinted by the Bannatyne and New Spalding clubs. Five years afterward appeared the work on which his fame chiefly rests, the 'History of Scotland.' The first edition is without date, but a commendatory epistle bears the date of 1527. It was written in Latin. He is distinguished by a patriotic zeal to magnify the achievements of his countrymen, and by an enlightened love of political liberty in advance of the age in which he lived. In 1527 Boece received an annual pension of 50 pounds (Scots), which was to be continued "until the king should promote him to a benefice of 100 marks Scots of yearly value." The pension was paid till 1534, when it is supposed he received the promotion—a very unsafe

inference. The rectorship of Tyrie, which he held at his death, is, however, supposed to have been the promotion in question.

Boeckh, August, ow'goost bèk, German classical scholar: b. Carlsruhe, 24 Nov. 1785; d. Berlin, 3 Aug. 1867. In 1803 he entered the University of Halle, where he was induced by the influence of Wolf to devote himself to the study of philology. After spending three years here, and more than a year in Berlin, he returned in 1807 to his native state, and in the same year became extraordinary, and two years later ordinary professor in the University of Halle. He had already acquired such renown as a scholar, that in 1810 he was offered the chair of rhetoric and ancient literature in the newly founded University of Berlin; and here he remained enjoying this and other important offices and dignities for the rest of his life. The works of Boeckh have made an epoch in the history of philology and archæology. In his studies of classical antiquities he set forth the principle that philology ought to be an historical method intended to reproduce the whole social and political life of any given people during a given period; and in accordance with this he divided the science into two parts: (1) Hermeneutics and Criticism; (2) the Practical and Theoretical Life of the Ancients. His views were vigorously attacked in various quarters, but the majority of German scholars gathered around him, and he himself carried his views into effect in a number of important works. The most remarkable of these are the following: an edition of Pindar; 'The Public Economy of the Athenians,' which has been translated into English; 'Metrological Investigations of the Weights, Coins, and Measures of Antiquity,' and 'Documents Concerning the Maritime Affairs of Attica.' Besides these he was uninterruptedly engaged from 1815 to the end of his life in making a collection of Greek inscriptions, which he published with the title 'Corpus Inscriptionum Græcarum,' and the first four volumes of which appeared at Berlin between 1824 and 1862. The first three volumes of a collection of his minor works, edited by Ascherson, appeared during the lifetime of the author.

Boehler, bè-lér, Peter, Moravian bishop: b. Frankfurt-on-the-Main, 1712; d. London, 1775. He was educated at Jena, joined the Moravians and was ordained to the ministry. He was sent as a missionary to America, working among the negroes in Georgia, the Germans in North Carolina (who later settled Bethlehem, Pa.), and the Indians of Pennsylvania. He went to Europe and returned to Bethlehem with a large number of colonists. In 1742, he was made bishop of the Moravian churches in America, England, Ireland, and Wales.

Boehm, bém, Henry, clergyman: b. Conestoga, Pa., 8 June 1775; d. near Richmond, Staten Island, 28 Dec. 1875. Under the influence of Bishop Asbury, Boehm, whose father was a Mennonite clergyman, became an itinerant minister of the Methodist Church. In this capacity he traveled over 100,000 miles on horseback between the years 1800 and 1842, when he was stationed at Staten Island

as a supernumerary. He served 74 years in the ministry, and at the time of his death was the oldest Methodist minister in America. A special service in honor of his 100th birthday was held 8 June 1875. He wrote 'Reminiscences, Historical and Biographical, of Sixty-four Years in the Ministry' (N. Y. 1865; new ed. 1875, ed. by J. B. Wakeley and others).

Boehm, Sir Joseph Edgar, Hungarian-English sculptor: b. Vienna, 1834; d. 12 Dec. 1890. He went to London in 1862, and lived there from that date, becoming a member of the Royal Academy in 1881. Among his important works are the great statue of Queen Victoria at Windsor; statues of Bunyan at Bedford; Wellington at Hyde Park Corner; Dean Stanley at Westminster Abbey; Drake at Plymouth; Carlyle on Thames Embankment, and busts of Ruskin, Gladstone, and Huxley. In 1889 he was knighted. He was the fashionable sculptor of his time, but much of his work fails to reach a high standard and his designs for the jubilee coinage of 1887 were very adversely criticised.

Boehme'ria, a large genus of plants of the natural order *Urticaceæ*, natives of tropical Asia, where various species furnish fibres used in rope- twine- thread- and cloth-making. *B. nivea* (China grass) is a nettle-like, but non-stinging perennial herb which is propagated by seeds or root division. When once established three crops are obtained annually and the fibre removed by hand stripping, machinery, or boiling in water or chemical solutions. None of these methods are wholly satisfactory; for which reason China and India, those lands of cheap hand labor, still supply the world. The fibre is used to make China-grass cloth. *B. tenacissima* (*ramie*) (q.v.) or rhea, is considered by some botanists as a variety of *B. nivea*. Attempts to establish the China-grass and ramie industries in the United States have not been very successful; not because the plants cannot be raised economically, but because of the high price of labor in manufacture, and the inefficiency of machines and degumming methods. Both species and several others of the genus are effective ornamental plants in borders and are hardy as far north as Washington, probably farther. Consult: Dodge, 'Descriptive Catalogue of Useful Fibre Plants of the World'; Royle, 'Fibrous Plants of India.'

Bœot'ia, bê-ô'sh'ā, a country of ancient Greece, bounded north by Phocis and the country of the Opuntian Locrians; east by the Euripus, or Strait of Eubœa; south by Attica and Megaris; and west by the Alcyonian Sea and Phocis. Its surface is estimated at 1,119 square miles; but the boundaries were not always the same. In the north it is mountainous and cold, and the air is pure and healthy, but the soil is less fertile than that of the other portion, which, however, is said to suffer from malaria. The mountainous part in the north was called in earlier times Aonia. Among the mountains of Bœotia are several remarkable in history and mythology — Helicon (now Zagora), the mountain of the Sphinx, the Teumessus, Libethrium, and Petrachus. Hypatus (modern name Samata), bounded the Theban plain on the

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east. A feature of the country was Lake Copais, the district around which is a valley completely surrounded by hills, and connected with the Eubæan Sea by subterranean passages. The lake was fed by the Cephissus, the largest river in the country, and the water was liable to accumulate more rapidly than the natural drainage of the country could carry it off. Hence the early inhabitants suffered much from inundations, and at a period previous to historical annals subterranean channels were built to carry off the water, which indicate a very early civilization, and recognized from the ruins which still remain as among the greatest works of antiquity. These works made Bœotia one of the most fertile districts of Greece. Recently the lake has been drained at great expense and a large tract of land reclaimed. The chief occupation of the inhabitants was agriculture and the raising of cattle. Bœotia was first occupied by the Pelasgian tribes. In the time of Bœotus (son of Itonus, and grandson of Amphictyon, from whom it is said to have derived its name) these were subject to the Hellenes. It was divided into small states, until Cadmus the Phœnician founded the government of Thebes. In later times all Greece worshipped the Hercules of Thebes. After the death of Xanthus, king of Thebes, most of the cities of Bœotia formed a kind of republic, of which Thebes was the chief city. Epaminondas and Pelopidas raised Thebes for a time to the highest rank among Grecian states. In Bœotia are several celebrated ancient battlefields, namely, Plataea (now the village Kokla), where Pausanias and Aristides established the liberty of Greece by their victory over the 300,000 Persians under Mardonius; Leuctra (now the village Parapogia), where Epaminondas checked the ambitious Spartans; Coronea, where the Spartan Agesilaus defeated the Thebans; and Chæronea (now Capranu), where Philip founded the Macedonian greatness on the ruins of Grecian liberty. Near Tanagra, the birthplace of Corinna, the best wine was produced; here, also, cocks were bred of remarkable size, beauty, and courage, with which the Grecian cities, passionately fond of cock-fighting were supplied. Refinement and cultivation of mind never made such progress in Bœotia as in Attica. The Bœotians were vigorous, but slow and heavy. Several Thebans, however, were worthy disciples of Socrates, and Epaminondas distinguished himself as much in philosophy as by his military talents. The people were particularly fond of music, and excelled in it. They had also some great poets and artists. Hesoid, Pindar, the poetess Corinna, and Plutarch, were Bœotians.

Boerhaave, Hermann, hër'man boor-hä'vê, Dutch physician: b. Woorhout, near Leyden, 13 Dec. 1668; d. 23 Sept. 1738. Boerhaave received from his father a liberal education. In 1682 he was sent to Leyden to study theology. Here he gave, at the age of 20, the first public proof of his learning and eloquence. In 1678 he received a gold medal from the city for an academic oration, in which he attacked the doctrines of Spinoza. In 1689 he received the degree of Doctor of Philosophy, and maintained an inaugural dissertation, 'De

Distinctione Mentis a Corpore,' in which he attacked Epicurus, Hobbes, and Spinoza. He now commenced, at the age of 22, the study of medicine. Drelincourt was his first and only teacher. From him he received little instruction; and by his own solitary study he learned a science on which he was afterward to exert so important an influence. His first study was anatomy, which he pursued from books, rather than from observation. He attended dissections, indeed, but his writings show a deficiency of practical knowledge. Still he exercised a salutary influence on the study of anatomy, as the use he made of mechanical illustrations induced anatomists to apply themselves to a more accurate study of the forms of the organs. After this preliminary study, Boerhaave read all the works, ancient and modern, on medicine, in the order of time, proceeding from his contemporaries to Hippocrates, with whose superior excellence and correct method he was forcibly struck. He also studied botany and chemistry, and although still preparing himself for the clerical profession, was made in 1693 Doctor of Medicine at Harderwyck. After his return to Leyden, some doubts being raised as to his orthodoxy, he finally determined to follow the profession of medicine. In 1701 the University of Leyden chose him, on the death of Drelincourt, to deliver lectures on the theory of medicine. Boerhaave now began to develop those great and peculiar excellences which make him a pattern to all who undertake the office of instruction. Pupils crowded from all quarters to hear him. His method was eclectic, combining the speculations of opposing schools, and led him to attach too much importance to mechanical and chemical theories of vital actions. In 1709 the University of Leyden appointed him successor to Hotton, in the chair of medicine and botany. The course of instruction to which Boerhaave was now devoted, induced him to publish two works, on which his fame still rests, namely, 'Institutiones Medicæ in Usus Annuæ Exercitationis Domesticæ,' and 'Aphorismi de Cognoscendis et Curandis Morbis in Usum Doctrinæ Medicinæ.' In the former, which is a model of comprehensive erudition and clear method, he unfolds his system in its fullest extent: in the latter he undertakes the classification of diseases, and discourses separately on their causes, nature, and treatment. The professorship of botany, which he also filled, contributed no less to his reputation. He rendered essential services to botany by his two catalogues of plants in the garden of Leyden, the number of which he had very much increased. We are indebted to him for the description and delineation of several new plants, and the introduction of some new species. In 1714 he was made rector of the university. At the end of this year he succeeded Bidloo in the chair of practical medicine, which he occupied for more than 10 years. In this office he had the merit of introducing clinical instruction, that is, of lecturing to his students at the bedside of patients in hospital, for the first time in Europe. Busily occupied as he already was, the university conferred on him, at the death of Lemort, the professorship of chemistry, which science he had

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taught since 1703. 'His Elements of Chemistry' is one of his finest productions, and notwithstanding the entire revolution which has taken place in this branch of science, is still highly valuable. His experiments are remarkable for their accuracy. So extensive a sphere of action gained for Boerhaave a fame that few learned men have enjoyed. People came from all parts of Europe to ask his advice. His property amounted at his death to 2,000,000 florins. Peter the Great visited him on his travels, and a Chinese mandarin wrote to him with the address, "To Boerhaave, the celebrated physician in Europe." In 1722 illness obliged him to remit his active pursuits. In this he returned in some measure to the principles of Hippocrates, from which, indeed, he had never departed far in practice. Boerhaave was a man of piety as well as learning. He arose early and devoted an hour every morning to prayer and the study of Scripture. He used to say that the life of a patient, if trifled with or neglected, would one day be required at the hands of the physician.

Boers (Dutch *boer*, a peasant or husbandman), the name commonly applied to the South African colonists of Dutch descent. The Cape Colony was founded by the Dutch in 1650. The Dutch were at this period the leading maritime power of Europe, and their African colonies assumed great importance. When Holland was reduced to the last extremity by the invasion of Louis XIV., serious thoughts were entertained of making the Cape Colony the final refuge of Dutch independence, but this crisis passed away with the advancing power of William. The colony subsequently fell into comparative neglect, and the colonists, left to their own resources, began to develop a character of their own. The troubles in which the parent state was involved by European wars now began also to affect them. The colony was taken possession of by the English in 1795, restored at the peace of Amiens in 1802, taken again in 1806, and finally ceded to England in 1815. The last change was highly distasteful to the colonists. Naturally distrustful of a foreign government, they had formed from their experience of the country and its inhabitants a policy and habits of their own, into which the newcomers could not be expected at once to enter. The Boers, moreover, were strongly conservative, believing that they understood the situation better than anyone else, and they had acquired in their struggles with the natives a reckless daring, which, added to the coolness and caution of the Dutch character, was likely to make them formidable opponents to any government which provoked their hostility.

The policy of the British governors was not always adapted to the circumstances, and the attempts of the British missionaries, encouraged by the colonial government, to convert and civilize the natives, excited the jealousy of the Boers, who thought their own interests compromised by the encouragement given to the converts. The government on various occasions sided with the Kaffirs against the Boers, which, whatever the merits of the particular disputes, was not calculated

to conciliate the latter. The emancipation of their slaves in 1833, and the cession to the Kaffirs in 1835 of a frontier district of neutral territory in the east, filled up the measure of provocation, and the Boers resolved to place themselves by emigration beyond the British rule. A first band set out by land in 1835 for Port Natal, but being ignorant of the passes of the country, went out of their way. Part of them settled in the district near the Zoutpansberg or Salt-pan Mountain, part proceeded to Algoa Bay, but did not succeed in forming a perfect settlement. Another band also proceeding to Natal was attacked by the Matebele Kaffirs, and obliged to fall back on the Modder River. After receiving reinforcements they again advanced and settling in the Orange River district, formed a commonwealth under Peter Retief. This colony was in 1837 invited to join the British settlers who had in the meantime taken possession of Port Natal. Crossing the Quathlamba Mountains for this purpose, Retief and some of his principal followers were treacherously murdered in an interview with the chief of the Zulu Kaffirs. The remainder turned south, and formed the settlement of Pietermaritzburg. Under the leadership of Pretorius they defeated the Zulus but the colonial government denied their right to form an independent community in this district.

In 1842, a British force was landed, and the Boers were compelled to retire from the coast and acknowledge the British sovereignty. Many of them recrossed the mountains, and settled in the Vaal district. Further disagreements with the colonial government, which had now possession of Natal, led to another emigration to the north of the Klipp River. Here they struggled successfully with the Kaffirs till 1845, when the colonial government proclaimed the Buffalo River the north boundary of Natal. The Boers openly resisted, but finding their strength unequal to the conflict, again emigrated to the Vaal country. In 1848 the colonial government likewise annexed by proclamation the Orange River settlement. The Boers, headed by Pretorius, took up arms, but being defeated retired beyond the Vaal, and with the previous settlers formed the Transvaal republic. Those who remained continued their resistance to the British authority until, in 1851, on the outbreak of the Kaffir war, the British relinquished the Orange River territory, and recognized the independence of the Orange Free State. In 1877 the Transvaal was annexed by Britain, according to the wish of many of the people, but war broke out in 1880, British forces suffered more than one defeat, and in 1881 the country was accorded a modified independence. Henceforth it was a common feeling among the Boers that they and not the British must be predominant in South Africa, and in October 1899, after an insolent ultimatum, the united forces of the Transvaal and Orange State invaded Natal. After nearly a year of warfare the two states were annexed by proclamation. The Boers, who are mostly rigid Calvinists, are described as frugal and hospitable, but also as ignorant, cunning, and cruel to the native races. See KRUGER; NATAL; ORANGE RIVER COLONY; TRANSVAAL, etc.

Boëthus, Greek sculptor: b. Chalcedon in the 2d century B.C. He is celebrated for his statues of children. 'The Boy With the Swan' was his most famous work. A girl playing with dice and a boy extracting a thorn were subjects of other masterpieces by him.

Boethius, bō-ē'thī-ūs, **Anicius Manlius Severinus**, Roman statesman and philosopher. b. about 470 A.D., in Rome or Milan; d. 524 or 526. He was educated in Rome, in a manner well calculated to develop his extraordinary abilities. Theodoric, king of the Ostrogoths, then master of Italy, loaded him with marks of favor and esteem, and raised him to the first offices in the empire. He exerted the best influence on the administration of this monarch, so that the dominion of the Goths promoted the welfare and happiness of the people who were subject to them. He was long the oracle of his sovereign and the idol of the people. The highest honors were thought inadequate to reward his virtues and services. But Theodoric, as he grew old, became irritable, jealous, and distrustful of those about him. The Goths now indulged in all sorts of oppression and extortion, while Boethius exerted himself in vain to restrain them. He had already made many enemies by his strict integrity and vigilant justice. These at last succeeded in prejudicing the king against him, and rendering him suspicious of Boethius. His opposition to their unjust measures was construed into a rebellious temper, and he was accused of a treasonable correspondence with the court of Constantinople. He was arrested, imprisoned, and executed. He was a philosopher, and practised in his life the virtues which he taught. He enjoyed a felicity in domestic life, which was due to his own virtues and those of his family. Thus in him the philosopher and the man were not separated. He made many laborious translations of the Greek philosophers, particularly of Aristotle. These translations, and especially his commentaries on Aristotle, caused him to be regarded up till the 14th century as the highest authority in philosophy. His treatise, 'De Musica,' also supplied for many centuries the place of Greek originals. He was long considered a Catholic saint, but there is no evidence that he was even a Christian. His fame now chiefly rests on his 'Consolations of Philosophy,' written in prison, a work of elevated thought and diction. It is written partly in prose and partly in verse. The oldest edition of this work was published at Nuremberg in 1473. It was translated by King Alfred and Chaucer, and was highly prized during the Middle Ages.

Boettcher, bé'tik-ēr, **Jean Frederick** (his name is also spelled **Boettiger**), German alchemist: b. Schleiz, 1681; d. 1719. A man of dissolute manners and dishonorable conduct, he is celebrated for his extraordinary adventures, and his fortunate discovery of the famous Dresden porcelain. Apprenticed to an apothecary in Berlin, he spent his time in the pursuit of alchemy, and fraudulently pretended to have made gold. This discovery, as it was believed to be, exposed him to the danger of a prosecution for sorcery, to avoid

which he fled. Such was the credulity of the time, that the Prussian government was anxious for his return, and the Elector of Saxony, then king of Poland, supplied him with the means of prosecuting his inquiries, and was entertained by his promises for three years. By the advice of Count Tschirnhausen, the elector was induced to turn the real chemical knowledge and abilities of Boettcher to account in developing the resources of the country. This sensible advice was rewarded with the discovery of a red clay at Meissen, from which a beautiful porcelain could be made. Boettcher was intrusted with the direction of the manufacture, but was so little trustworthy that he had almost to be detained a prisoner to prevent his divulging the secrets of the process. He had actually entered into a negotiation with some Prussians to do so, and his death alone saved him from the punishment of his treachery.

Boeuf Bayou, béf bí'oo, a stream in Louisiana, formed in times of high water by overflow from the Mississippi, when it affords nearly 100 miles of steamboat navigation. It is an affluent of the Washita River.

Boffin's Bower, in Dickens' 'Our Mutual Friend,' home of the Boffins. The name was given by Mrs. Boffin, who did not approve of its former name, "Harmon's Jail."

Bog, an Irish word, literally meaning soft, applied in Great Britain to extensive districts of marshy land, such as we commonly call in this country swamps. They consist, in Europe, so universally of peat, that this substance is there generally regarded essential to a bog. As we use the word, it is in the sense of a quagmire; any soft and wet spot into which a man would sink in attempting to cross it, being called a bog. The true bog is most commonly found in northern latitudes, and in districts where great humidity prevails. Their situation is not necessarily low, nor their surface level. Some of the great Irish bogs present even a hilly appearance, which, perhaps, is the result of the spread of the mosses in their lateral growth from lower situations over intervening higher grounds. Bogs were formerly supposed to owe their origin to the destruction of forests, and in particular to the obstruction of drainage from fallen trees, causing lodgments of water, and favoring the growth of marsh plants. This theory can only be partially true. Fallen trees and also standing roots are frequently found in a state of great preservation in bogs, but the agency of felled trees in the production of bog has been completely disproved, six or seven feet of bog being found under the roots of remaining trees, showing the previous formation of the bog. The process of bog formation is thus described: When a shallow pool induces the formation of aquatic plants, they gradually creep in from the borders to the deeper centre. Mud accumulates round their roots and stalks, and a spongy semi-fluid mass is formed, well suited for the growth of moss, particularly Sphagnum, which now begins to luxuriate, continually absorbing water, and shooting out new plants above as the old decay beneath; these are consequently rotted, and compressed into a solid substance, grad-

BOG-BUMPER—BOG IRON ORE

ually replacing the water by a mass of vegetable matter. A layer of clay, frequently found over gravel, assists the formation of bog by its power of retaining moisture. When the subsoil is very retentive, and the quantity of water has become excessive, the superincumbent peat has sometimes burst forth and floated over adjacent lands. This happened near Killarney in 1896, and caused the loss of nine lives. Quagmires are caused by the decay of the roots of plants underneath. The plants thus detached from the bottom, rise to the surface, and are kept floating in moisture. Elastic under light pressure, they yield suddenly to the weight of heavy bodies, their only strength consisting in the interlacing of their decayed fibres.

Throughout the country, along the seaboard to the gulf of Mexico, bog-like swamps are of frequent occurrence. Their outer portions are sometimes wooded swamps, while within they present moss-covered heaths, stretching, like the western prairies, farther than the eye can see, and dotted occasionally with clumps or little islands of trees. In New England, the northwestern States, and Canada, the bogs furnish genuine peat, and some of those bordering on the Great Lakes are of great extent. On Long Island, near New York, the bogs present a marked feature along the sandy coast.

British bogs are generally divided into two classes—red bogs, or peat mosses, and black bogs, or mountain mosses. The former class are found in extensive plains frequently running through several counties. The Chatmoss in Lancashire, and the Allen in Ireland, are examples of this class. Their texture is light and full of filaments, and is formed by the decay of mosses and plants of different kinds. The color becomes darker, and the density increases with the depth of the bog. The lower parts, being more entirely decayed, approach nearer to the nature of humus than the upper portion. They are also more carbonaceous, and consequently more valuable for fuel. The depth of the red mosses varies from 12 to 42 feet. The chief reasons of the unproductiveness of this class of bogs are the acids in which the plants composing them abound, and which are noxious to the higher orders of vegetation, and the circumstance that the decomposition of the plants takes place under water, where they are excluded from the action of the oxygen and nitrogen of the air, and consequently deprived of the power of evolving carbon and ammonia. Black bog is formed by a more rapid decomposition of plants. It is heavier and more homogeneous in quality. It is common in Ireland and Scotland, but is usually found in limited and detached portions. In Ireland these frequently rest on calcareous subsoil, which is of great value for reclaiming them. The black bog is so frequently found at high elevations that its reclamation presents considerable difficulties, but when it is found in plains or gentle inclinations it may be reclaimed with comparative ease. The soil in mountainous districts, being shallow, is not suited for cereals, but if the mistake of sowing these is avoided, they may be made into good pasture land. The reclamation of the extensive red bogs found

in various parts of the country, especially in Ireland, which has more than 1,500,000 acres of them, has long occupied attention; but the progress of improvement has been hindered by questions of land tenure, disposal of capital, and other difficulties external to the practicability of the desired reformation. Many extensive experiments have, however, been made with encouraging success, and while it is perhaps doubtful how far reclamation will repay the immediate improver, it appears from a national point of view to offer undoubted advantages.

In the reclamation of bog land three things require to be accomplished. The land must be thoroughly drained, and a permanent system of drainage established. The loose and spongy soil must be mixed with a sufficient quantity of mineral matter to give the requisite firmness to its texture, and to fertilize its superabundant humus. Proper manures must be provided to facilitate the extraction of nutriment from the new soil, and a rotation of crops suitable for bringing it into permanent condition adopted. The difficulties of reclamation lie chiefly in the first and second of these requirements.

The materials best adapted for reclaiming peat are calcareous earths, limestone gravel, shell marl, and shell sand. Caustic lime, although it neutralizes the acids of the soil, causes too rapid a decomposition of the vegetable matter. These materials are frequently found in the subsoil or in the neighborhood, but the labor of raising them from the subsoil is often greater than that of bringing them from other, especially from adjacent quarters.

Paring and burning, or removing a portion of the peat for fuel, when the subsoil is good, are other modes of facilitating improvement. The limited demand for peat fuel prevents the latter system being carried on extensively. Thoroughly reclaimed bogs are not liable to revert to their former condition. For further particulars see CHATMOSS.

Bog-bumper, Bog-jumper, or Bog-pumper.
See BITTERN.

Bog-butter, a fatty spermaceti-like mineral resin found in masses in peat-bogs, composed of carbon, oxygen, and hydrogen, and for years supposed to have been formed by the decomposition of peat. Since 1885 it has been decided that it is of animal origin, being, in fact, a variety of adipocere, and is formed by the decomposition of animal substances, out of contact with the air.

Bog Iron Ore, a variety of limonite formed in bogs and swamps by the reducing action of decaying vegetable matter on soluble iron salts. It is generally loose textured, and brown or brownish yellow in color. The ore usually contains such a high percentage of impurities, especially sulphur and phosphorus, that it cannot be utilized for iron manufacture; it finds limited application, however, in the purification of illuminating gas. Deposits of bog iron ore are widespread. In the United States extensive beds occur along the Atlantic coast from New York southward, and the first blast furnaces erected in this country were supplied from them. Similar deposits occur in Great Britain and most of the countries of Europe.

Bog-moss. See SPHAGNUM.

Bog-oak, trunks and large branches of oak found imbedded in bogs and preserved by the antiseptic properties of peat, so that the grain of the wood is little affected by the many ages during which it has lain interred. It is of a shining black or ebony color, derived from its impregnation with iron, and is frequently converted into ornamental pieces of furniture and ornaments, as brooches, earrings, etc.

Bog-trotter, a name contemptuously applied to the Irish peasantry on account of their ability to make their way across the bogs where no one else can find footing, which frequently gives them a means of escape from officers of police, and other pursuers.

Bogaers, Adriaan, à'drī-än bö'gärs, Dutch poet: b. The Hague, 1795; d. 1870. He holds an eminent place among the many disciples of Tollens, and surpasses his master in correctness of taste. He long withheld his compositions from publication, and not till 1832 did he become known to his countrymen; he then published his first lyric poem, 'Volharding,'—an appeal to his countrymen to stand fast in the struggle with Belgium,—together with other patriotic pieces. His first poem of any considerable compass, the epic 'Jochebed,' and his masterpiece, 'The Voyage of Heemskerck to Gibraltar,' were first formally published in 1860-1, though they had had for many years a private circulation among friends. He afterward published three volumes, 'Ballads and Romances,' 'Flowers of Poesy from Abroad,' and 'Poem.'

Bo'gan, or New Year River, a river of East Australia, rises in the Harvey range, flows northwest, and empties into the Darling River; length over 300 miles.

Bogar'dus Everardus, second pastor of the church in New Amsterdam (New York): d. 27 Dec. 1647. He is noted as the husband of Anneke Jans, whose ownership of 60 acres of land in the business portion of New York has given her descendants occasion for almost continuous law suits, during 200 years, to recover possession of the property which is held by the corporation of Trinity Church.

Bogardus, James, American inventor: b. Catskill, N. Y., 14 March 1800; d. 13 April 1874. He was apprenticed to a watchmaker, and early showed the bent of his mind by improvements in the construction of eight-day clocks, and by the invention of a delicate engraving machine. The dry gas meter is his invention, as is also the transfer machine to produce bank-note plates from separate dies; and in 1839 his plan for manufacturing postage stamps was accepted by the British government. Later he introduced improvements in the manufacture of india-rubber goods, tools, and machinery; and invented a pyrometer, a deep-sea sounding machine, and a dynamometer. In 1847 he built the first iron building ever erected in the city of New York.

Bogatzky, Karl Heinrich von, kār'l hīn'-rīh fōn bö-gats'ke, Protestant theological writer: b. Tankowa, Silesia, 1690; d. Halle, 1774. His principal works are: 'Tägliches Schatz-Kästlein der Kinder Gottes,' published in 1718; 'Geistliche Gedichte,' in 1749. The former has been translated into English under the title of Bogatzky's 'Golden Treasury.'

Bogdo-ola, bög-dō-oo'la, or **Holy Mount,** a hill in Russia, in the government of Astrakhan, near the Aktuba, and 14 miles east of Tchernoiarsk. It forms an isolated cone, nearly 500 feet high, in the middle of a vast steppe. It appears to rest on limestone, overlain by sandstone, which on the northeast side rises perpendicularly like a wall, and is cut into deep clefts, frequented by innumerable birds. The sandstone is succeeded by alternate red and white layers of clay and sand, which have a very singular appearance. The summit is chiefly composed of masses of rock-salt. At the foot of the hill there is a salt lake called Bogdom Dabassu.

Bogdan, Negrul, governor of Moldavia, son of Stephen the Great, who, at his death in 1522, counseled his son to anticipate by voluntary submission to the Turks, an inevitable conquest. Bogdan did not at first follow this counsel; but having lost within a year the battle of Mohács, and Hungary having been invaded by a large Turkish force, he sent to Solyman offers of submission. He was received with favor by the Sultan, and in return for an annual tribute of 4,000 crowns of gold, beside numerous horses and falcons, Moldavia was allowed to preserve its own religion, an independent administration, and the right to choose its own princes. Bogdan did not long survive this treaty, and his successor refusing to pay the tribute, drew again the arms of the Turks upon the Moldavian principality.

Bogdanóvich, Modést Ivanovich, mö-däst ē-van'ō-vīch bög-dā-nō'vech, Russian military historian and commander: b. 1805; d. 6 Aug. 1882. He was a very able soldier, and even abler with the pen: his 'Bonaparte's Campaign in Italy, 1796,' and 'History of the Art of War,' and particularly his 'History of the Campaign of 1812,' having attracted wide notice.

Bogdanowitch, Hippolyt Federowitch, hīp'-pō-līt fēd-er-ō'vech bög-dā-nō'vech, Russian Anacreon: b. Perewolotschna, in White Russia, 1743; d. 1803. His father was a physician. He was designed for an engineer, but the sight of a splendid play, and the reading of Lomonosow's poems, turned his inclination to poetry. He wished to become an actor, but the manager of the theatre, Cheraskow, dissuaded him from his purpose. By his advice he applied himself to the study of the fine arts, and to learning foreign languages. He gained patrons and friends, and in 1761 was made inspector in the University of Moscow, and afterward translator in the department of foreign affairs. In 1762 he traveled with Count Beloselsky as secretary of legation to Dresden, where he devoted his whole attention to the study of the fine arts and of poetry till 1768. The beautiful pictures in the gallery of that place inspired him to write his 'Psyche,' which appeared in 1775, and fixed his fame on a lasting foundation. After this he devoted himself to music and poetry, in solitary study at St. Petersburg, till Catharine called him from his retirement. He then wrote on different occasions several dramatic and historical pieces. In 1788 he was made president of the imperial archives. In 1795 he took leave of the court, and lived as a private man in Little Russia. Alexander recalled him to St. Petersburg, where he lived till his death. He was as

BOGERMAN — BOGOS

remarkable for modesty as for genius, and a man of childlike goodness and vivacity.

Bogerman, Jan, yän bö'gér-män, Dutch theologian: b. Oplewert, 1576; d. 1637. He was professor of divinity at the University of Franeker; participated in the Armenian controversy, and was president of the Synod of Dort, 1618. With four others he translated the Bible into Dutch; this translation is at present the common Dutch version. He also wrote 'Annotationes contra H. Grotium,' and translated Beza's 'De la punition des hérétiques.'

Bogert, George H., artist: b. New York, 1864. His first studies were made under Thomas Eakins; later he studied in Paris under Raphael Collins, Aimé Morot, and Puvis de Chavannes. He won the Webb prize, 1898; the first Hallgarten prize of the National Academy of Design, 1899; and was awarded a bronze medal at the Paris Exposition, 1900. His studio is in New York.

Boggs, Charles Stuart, American naval officer: b. New Brunswick, N. J., 28 Jan. 1811; d. 22 April 1888. He entered the navy in 1826; served on the Princeton in the Mexican war; was assigned to the gunboat Varuna in Farragut's Gulf squadron in 1861. In the attack on forts St. Philip and Jackson, in April 1862, he destroyed six Confederate gunboats and two rams, and in the last moments of the fight his own vessel was sunk. In 1869-70 he served with the European squadron; in the latter year was promoted to rear-admiral; and in 1873 was retired.

Boggs, Frank M., artist: b. Springfield, Ohio, 6 Dec. 1855. He received his art education at the Ecole des Beaux Arts and under Gérôme in Paris. In 1882 the French government bought his picture, 'Place de la Bastille,' for the Luxembourg Museum, and in 1883 his 'Isigny' for the Niort Museum. His pictures are to be found in many of the best French private collections, and in the museums at Havre, Nantes, and Dieppe. In the first prize fund exposition of the American Art Gallery (N. Y.), he received a prize of \$2,500 for his picture 'A Rough Day, Honfleur,' now in the Boston Museum.

Bøgh, Erik, è'rik bèg, Danish poet and dramatist: b. Copenhagen, 17 Jan. 1822. He is best known for his witty stanzas and epigrams in periodicals, for 'This and That,' a collection of humorous essays, and for a hundred or so of plays and farces. A novel, 'Jonas Tvärnøse's Vexations,' has merit.

Boghaz-Keui, bö'gáz-kyé'e, Asia Minor, a village in the vilayet of Angora, commonly identified with the ancient Pterium, though this is now doubtful. The village is insignificant, but important Hittite ruins, including a palace and a number of unusual sculptures, have been discovered near by.

Boghead Coal, a brown cannel-coal, found at Boghead, near Bathgate, Scotland, and very valuable for gas and oil making.

Bognor, bög'nér, an English watering-place on the coast of Sussex, nine and a half miles southeast of Chichester by railway. There is a pier 1,000 feet long, constructed chiefly of iron, and also an esplanade. The

place was brought into vogue toward the end of last century by Sir R. Hotham, who spent \$300,000 on it. Pop. (1901) 6,180.

Bo'go, Philippines, a town with about 17,000 population, situated on the east coast near the northern end of the island of Cebu. It has a good harbor.

Bog'omiles, a religious sect, said to have been pretty widely spread in Thrace and Bulgaria as early as the 10th century. They were persecuted by the Byzantine emperor, Alexander Comnenos, and their leader, named Basil, was burned alive at Constantinople in 1118. The name of the sect is said to be composed of two Slavonic words, meaning friends of God. The Bogomiles believed that God had two sons, Satanael and Jesus, or Logos. The former rebelled, and created the material world, and also man. God gave a soul to man, but he was left under the control of Satanael until the coming of the Logos. The law was given to Moses by Satanael, and is not recognized by the Bogomiles, who accept of the Old Testament only the Psalms and the Prophets. The Logos, or Christ, came down from heaven to deliver man from the power of Satanael. This sect, which held many extravagancies of doctrine, continued to exist for several centuries. They practised severe asceticism, rejected the sacraments, or put new interpretations on them, and made frequent prayers both by day and night.

Bogos, bö'göz, a people of Abyssinia, occupying a district to the south of the Anseba, to the east of Habab and Mensa, and to the north and west of Barca. The land is intersected by the broad and beautiful valley of the Anseba, and comprises on the west the elevated and hilly region as far as the sources of the Barca, and on the east the slopes of the plateau of Mensa. The climate and vegetation are similar to those of Abyssinia. The rainy season lasts from March to September, when the Anseba overflows its banks and fertilizes the valley through which it flows. There is a great variety both in the flora and the fauna of the country. Large baobab trees, sycamores, and tamarinds overshadow the banks of the Anseba, which are rendered almost impassable by the number of Euphorbia and creeping plants. At the same time there are to be found rhinoceroses, elephants, wild boars, buffalos, antelopes, lions, leopards, wildcats, jackals, wolves, etc., in great numbers. The population is only about 10,000, which is engaged in agriculture and the raising of cattle, and carry on a trade with the neighboring places in corn, butter, ivory, skins, buffalo-horns, and ostrich-feathers. Their language, which is akin to the Agow, is called by themselves Bilin. Their countenance is Greek in its contour, their body light, powerful, and well formed; the color of their skin dark olive-brown; their lips are thin, the cheekbones not prominent, and they have generally bushy whiskers. The patriarchal institutions of the Bogos are peculiar. The members of each union of families are pledged to apprehend any one of their number who is charged with the commission of a crime. The laws relating to dowries, inheritance, and murder are regularly codified. The religion is the Christian, but Mohammedanism, which is increasing, has a considerable number of adherents.

Bogoslov, bō-gō-slōf', a small volcanic island of the Aleutian archipelago, lying northwest of Unalaska. It was formed in 1795-6 by a series of volcanic upheavals; on the site previously there had been low rocks and reefs.

Bogotá, bō-gō-tā', or **Santa Fé de Bogota'**, capital of the United States of Colombia, has a population of about 100,000; and despite the fact that it is but 4° 41' north of the equator, the elevation of the plateau on which it stands is so great that the breeze is cool and invigorating. A fertile plain or table-land of exquisite beauty extends for a distance of about 30 miles on three sides, while directly above rise two mountains of moderate height, and surrounding the whole scene are snow-capped peaks of the Andes—among them the extinct volcano of Tolima. Water is supplied by two mountain streams flowing through the town itself. Unfortunately the overcrowding of buildings occupied by the poorer classes, and the absence of a good system of drainage, offset the conditions otherwise favorable to health. Bogotá is lighted by gas and electricity; its streets are well laid out; and the houses, though low, are substantially built. There is a valuable library of over 50,000 volumes; and the university, founded in 1867, is considered the best in the Andean region north of Peru. On 12 Sept. 1902, the government decreed the establishment of a museum and academy, to increase the popularity and efficiency of the National School of the Fine Arts. Founded in 1538 by Gonzalez Ximenes de Quesada, a native of Santa Fé, a small town near the city of Granada, and in the Spanish province of that name, Bogotá became the capital of New Granada, as the country was first called by the Spaniards. For history, industries, etc., see COLOMBIA.

Bogue, David, the originator of the London Missionary Society: b. Hallydown, Berwickshire, 18 Feb. 1750; d. Brighton, 25 Oct. 1825. In 1771 he removed to London, and became minister of an Independent chapel at Gosport. In 1780 he became tutor to an establishment for directing the studies of young men destined for the ministry in the Independent communion. He now began the formation of a missionary scheme, which afterward resulted in the London Missionary Society. The influence which the establishment of this institution had on the public mind was great, and the springing up of the British and Foreign Bible Society and the Religious Tract Society, at short intervals, proves how much good was effected by the impetus it imparted. In the establishment of both of these he took an active part, contributing to the latter body the first of a series of publications which have been of great use. In 1815 Mr. Bogue received the degree of Doctor of Divinity from Yale College. The only works of any extent for which we are indebted to the pen of Dr. Bogue are: 'An Essay on the Divine Authority of the New Testament,' 'Discourses on the Millennium,' and a 'History of Dissenters,' which he undertook in conjunction with his pupil and friend, Dr. Bennet. The first of these has been translated into the French, Italian, German, and Spanish languages, and has been widely circulated on the continent of Europe.

Boguslawski, bō-goo-slāv'ske, **Palm Henry Louis von**, astronomer: b. Magdeburg, 1789;

d. Breslau, 1851. He was educated in the Cathedral School of Magdeburg, and early displayed a particular turn for astronomical pursuits. The comet of 1807 gave him the first opportunity of making special observations. In 1809, having been appointed bombardier in the Silesian Artillery Brigade, he passed his examination in Berlin with so much distinction that he was named lieutenant, and remained in attendance on the general military school in Berlin, where he took part in Bode's observations on the great comet. The campaigns of the war of independence procured him, through his connection with Bode, access to the best observatories and the acquaintance of the most distinguished astronomers. His military career terminated at the battle of Waterloo, after which, in consequence of a supervening weakness in his eyesight, he became unfit for further active service. He afterward turned his attention to agriculture, and in course of time his eyesight was completely restored. His love for astronomy had always remained, though he had wanted proper opportunity for cultivating it; but in 1829, on resuming his residence in Breslau, his studies again took that direction, and he became first conservator and then director of the observatory. By his discovery, in 1834, of the comet named after him, and his observations on Saturn's rings, and the comets of Biela, Encke, Halley, etc., he rendered important services. As no chair was connected with his position at the observatory, he at first merely delivered popular lectures. A regular professorship, however, was given him in 1836. As a writer he made himself known by the publication of the 'Uranus.'

Boha-eddin, bō-ha-ēd'din, or **Bohaddin**, Arabian scholar and historian: b. Mosul, 1145; d. 1235. Having attained proficiency in Moslem law, he became, at the age of 27, a lecturer at Bagdad. In 1186 he made the pilgrimage to Mecca, and returned through the holy land, visiting Jerusalem, Hebron, and other sacred cities. While in Damascus, he was summoned to the Moslem camp by Saladin, who was desirous of availing himself of the services and influence of so able a scholar, and a man of such reputed Moslem piety and zeal. He accordingly brought his learning and talent to the work of glorifying the wars of that ambitious monarch, in a treatise on the 'Laws and Discipline of Sacred War.' Saladin appointed him *cadi* of Jerusalem and of the army, and a strong attachment from the commencement existed between them, which the scholar knew well how to turn to good account. On the death of Saladin he transferred his attachment to the son, Malek-al-Dhaher, whom he was instrumental in establishing in the succession of the throne. In return, the new prince of Aleppo appointed Boha-eddin to the office of *cadi* of the city, which brought him constantly to reside in the royal court. Aleppo now became the resort for men of science and learning. At this period of his life Boha-eddin founded a college, and he continued to give lectures until he was 90 years old. His great work was, however, the 'Life of Saladin.' It is a work pronounced, on the whole, free from the extravagance which so generally renders Oriental productions distasteful to the more practical scholars of the West. It is written from the standpoint of a zealous Moslem, rather than from that of the practised soldier or the politic statesman.

BOHEA — BOHEMIA

Bohea, an inferior kind of black tea. The name is sometimes applied to black teas in general, comprehending Souchong, Pekoe, Congou, and common Bohea.

Bohemia, Böhmen (anciently БОHEИМ), a province with the title of kingdom in the Austro-Hungarian monarchy, bounded on the southwest by Bavaria, on the northwest by the kingdom of Saxony, on the northeast by the Prussian province of Silesia, and on the southeast by Moravia and the archduchy of Austria. It contains 20,051 square miles, and has (1900) 6,318,697 inhabitants, of whom above three fifths are Czechs, nearly 90,000 Jews, and more than 2,000,000 are Germans. Bohemia is surrounded on all sides by mountains, possesses large forests and many small lakes or ponds. Its plains are remarkably fertile. The largest rivers are the Elbe and the Moldau. All sorts of grain, flax, hops (the best in Europe), and fruits are exported. Wine is not abundant, but in the neighborhood of Melnik is of pretty good quality. The raising of sheep, horses, swine, and poultry is carried on to a considerable extent. The mines yield silver, copper, lead, tin, garnets, and other precious stones, iron, cobalt, arsenic, uranium, and tungsten, antimony, vitriol, alum, calamine, sulphur, plumbago, and coal in abundance. There are also numerous mineral springs, but little salt.

The industry of Bohemia, favored by its central situation, has long rendered it one of the most important governments of the Austrian empire. Spinning and weaving are extensively carried on in the northern and southeastern districts; manufactures of lace, ribbons, metal, and wood work, chemical products, and other branches of skilled industry are also largely developed. Pottery, porcelain, glassware, cutting of precious stones, give employment to many hands. The glassware of Bohemia alone, which is known all over Europe, employs 50,000 workers. Large quantities of beer (Pilsener) of the kind known as lager are exported. Prague, the capital, is the centre of the manufactures and of the commerce of the country. The largest towns are Prague, Pilsen, Reichenberg, Budweis, Teplitz, Aussig, and Eger. For internal intercourse there are excellent highways, extending to 10,000 miles, and several important lines of railway leading both southeast to Vienna and northwest toward Dresden. The Bohemians of all ranks are distinguished for public spirit. Among the public establishments for education are a German and a Czech university at Prague, two technical high schools, four theological academies, many gymnasiums, and over 5,000 schools. The prevailing religion is the Roman Catholic; other sects, however, are tolerated. The language of the country is Bohemian, a dialect of the Slavonic; in some districts, and in most of the cities, German is spoken. See BOHEMIAN LANGUAGE AND LITERATURE.

History.—Bohemia received its name from a tribe of Gallic origin, the Boii, who were expelled by the Marcomans at the commencement of the Christian era; the latter were in turn obliged to give place to the Germans, and these to the Czechs, a Slavonic people who had established themselves in Bohemia by the middle of the 5th century. The country was at first divided into numerous principalities, which were

temporarily united into a monarchy in 627 under Samo, but the work of this prince did not survive himself. Charlemagne attempted the conquest of Bohemia without permanent result, although he succeeded in rendering it tributary; and the Emperor Louis had his army nearly destroyed by the Bohemians in 849. Christianity was introduced into Bohemia in the reign of Borzwoj I. (894-902), a descendant of Přemysl, whose family held sway in Bohemia for about six centuries (722-1306). In 1092 Bohemia was finally recognized as a kingdom under Wratislas II. Up to 1230 the monarchy was elective and then became hereditary; the right of election, however, was suspended, not abrogated. The monarchs received investiture from the German emperor, held one of the great offices in the imperial court, and were recognized as among the seven electors of the empire. Separated from Germany, however, by a rampart of mountains, by origin, language, and national customs, the Bohemians kept aloof from the general politics of the empire, and their kings frequently received dispensations from attending the diet. The peasantry were in a state of villenage, but there was a numerous and powerful nobility, the diet assembled frequently, and the nobles came armed to defend their rights. The royal authority was limited by the coronation oath. Bohemia was frequently at war with Poland, the emperor, or some of the surrounding states; it was successively united and disunited with Hungary, Silesia, Moravia, etc., according to the course of wars and alliances. Ottokar II. (1253-78) had extended his conquests almost from the Adriatic to the Baltic, when he lost them and his life in contest with Rudolph, the founder of the too successful house of Hapsburg. His grandson Wenceslas III. was assassinated at Olmütz, and with him closed the dynasty of Přemysl. The house of Luxemburg succeeded in 1310, and governed Bohemia till 1437. Under Charles IV. (1346-78), who also held the sceptre of the German empire, Bohemia prospered, and advanced in civilization and science. Toward the close of this second dynasty civil wars were excited by the promulgation of the doctrines of Huss and the persecution of his followers. These wars were protracted by the genius of John Ziska, the leader of the Hussites, a man who, although latterly quite blind, has for military genius been compared to Hannibal. Ziska was rarely defeated, and his success inspired the utmost enthusiasm in his followers. He has been called the inventor of the modern art of fortification, and by his skill in this art he made Mount Tabor an impregnable fortress. After the death of Ziska the moderate party of the Hussites, who were called Calixtines, from their insisting on the retention of the sacramental cup for the laity, united with the Roman Catholics, and Sigismund was acknowledged king in 1433. The conditions of this compact being ill observed, George Podiebrad, a nobleman of the reformed party, was by them elected king in 1458. On his death in 1471 they chose Wladislas, son of Cassimir, king of Poland, who also obtained the crown of Hungary. His son Louis lost both crowns with his life in the battle of Mohács against the Turks, and Ferdinand of Austria became, in 1527, sovereign of both kingdoms. Bohemia then lost its separate existence, being declared hereditary in the house of Austria. Its subse-

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quent history pertains to that of the Austrian empire. It was desolated by the Thirty Years' war, and it suffered severely from religious persecutions, by which, indeed, the reformed faith was almost entirely suppressed in it. The Emperor Joseph II. gave some protection to the Protestants. In 1848, when Europe was convulsed with revolutionary movements, a momentary attempt was made to assert the ancient independence of Bohemia against the Austrian dominion; a conflict took place between the army and the people, Prague was bombarded, and the insurrection suppressed. Since then the most prominent feature in the history of Bohemia has been a constant struggle for ascendancy between the Slavonic Czechs and the Germans. See AUSTRIA.

Bohemia Manor, the name given to a tract of some 5,000 acres bordering on the Elk River, Maryland, granted by Lord Baltimore in 1666 to Augustine Herman. The latter was a Bohemian surveyor who pledged himself to make a map of Maryland in return for the land. Obtaining denization papers, he and his family were naturalized under the first legislative act of that kind in the province.

Bohemian Brethren, a Christian sect which arose in Bohemia about the middle of the 15th century from the remains of the stricter sort of Hussites. Dissatisfied with the advances toward popery by which the Calixtines had made themselves the ruling party in Bohemia, they refused to receive the compacts, as they were called, that is, the articles of agreement between that party and the council at Basel (30 Nov. 1433), and began about 1457, under the direction of a clergyman, Michael Bradatz, to form themselves into separate parishes, to hold meetings of their own, and to distinguish themselves from the rest of the Hussites by the name of Brothers, or Brothers' Union. Amidst the hardships and oppressions which they suffered from the Calixtines and the Roman Catholics without making any resistance, their numbers increased so much, through their constancy in their belief and the purity of their morals, that in 1500 their parishes amounted to 200, most of which had chapels belonging to them. The peculiarities of their religious belief are seen in their confessions of faith, especially their opinions with regard to the Lord's Supper. They rejected the idea of transubstantiation, and admitted only a mystical spiritual presence of Christ in the eucharist. In other points they took the Scriptures as the ground of their doctrines throughout, and for this, but more especially for the constitution and discipline of their churches, received the approbation of the reformers of the 16th century. This constitution of theirs was framed according to what they believed to have been that of the oldest apostolic churches. They aimed at restoring the primitive purity of Christianity by the exclusion of the vicious from their communion, and by making three degrees of excommunication, as well as by the careful separation of the sexes, and the distribution of the members of their society into three classes—the beginners, the proficient, and the perfect. Their strict system of superintendence, extending even to the minute details of domestic life, did much toward promoting this object. To carry on their system they had a multitude of officers of different degrees; or-

daining bishops, seniors, and conseniors, presbyters or preachers, deacons, ædiles, and acolytes, among whom the management of the ecclesiastical, moral, and civil affairs of the community was distributed. Their first bishop received his ordination from a Waldensian bishop, though their churches held no communion with the Waldenses in Bohemia. They were destined, however, to experience a like fate with that oppressed sect. When, in conformity with their principle of not performing military service, they refused to take up arms in the Smalkaldic war, Ferdinand took their churches from them, and in 1548, 1,000 of their society retired into Poland and Prussia, where they first settled in Marienwerder. The agreement which they concluded at Sandomir (14 April 1570) with the Polish Lutherans and Calvinistic churches, and still more the Dissenters' Peace Act of the Polish Convention (1572), obtained toleration for them in Poland, where they united more closely with the Calvinists under the persecutions of the Swedish Sigismund, and have continued in this connection to the present day.

Their brethren who remained in Moravia and Bohemia recovered a certain degree of liberty under Maximilian II., and had their chief residence at Fulneck in Moravia, whence they have been known as the Moravian Brethren. The issue of the Thirty Years' war, which terminated so unfortunately for the Protestants, occasioned the entire destruction of their churches, and their last bishop, Comenius, who had rendered important services in the education of youth, was compelled to flee. From this time they made frequent migrations, the most important of which took place in 1722, and occasioned the establishment of the new churches of the Brethren by Count Zinzendorf (q.v.). Although the old Bohemian Brethren must be regarded as now extinct, this society will ever deserve remembrance, as a quiet guardian of Christian truth and piety, in times just emerging from the barbarity of the Middle Ages; as a promoter of pure morals, such as the reformers of the 16th century were unable to establish in their churches; and as the parent of the esteemed and widely extended association of the United Brethren, whose constitution has been modeled after theirs. See UNITED BRETHREN.

Bohemian Forest (BÖHMERWALD), a mountain range or ridge of central Europe, extending from the Fichtelgebirge southward toward the confluence of the Elbe and the Danube, and separating Bavaria from Bohemia. The Bohemian forest in ancient times formed a part of the Silva Hercynia, the highest peaks being the Arber (4,840 feet high) and Rachel. The great abundance of wood has occasioned the establishment of many glass houses, forges, etc., in this region. The inhabitants have acquired in their seclusion from the world, many characteristic virtues and vices.

Bohemian Language and Literature. The language of Bohemia, otherwise called Czech, is one of the Slavonic group of the Aryan or Indo-European family of tongues, and accordingly allied to Polish, Russian, Servian, Bulgarian, etc. (See SLAVS or SLAVONIANS.) The Czech (Bohemian) language or dialect was the first of the Slavonic idioms which was cultivated scientifically. It is spoken in Bohemia, Moravia, with slight variations in Austrian Silesia, in Hun-

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gary, and in Slavonia. Three chief dialects of this language are recognized, namely the Bohemian or Czech proper, the Moravian of Moravia and Silesia, and the Slovak of Hungary. The Bohemian alphabet consists of 42 letters, expressing a great variety of sounds. The English sound of *ts* the Bohemian expresses with *c*, the English *y* with *g*, the *sh* with *ss* or *s*, the Italian *cc* or *ci* with *c* modified, the French *ge* and *gi* with *z*, the Italian *u* with *y*, the *gn* with *n*, the English *w* with *w*, particularly at the end of words. The sound of entire words, not that of the single letters which compose them, determines the roughness or smoothness of their pronunciation. The terminations of the various declensions and conjugations are mostly vowels, or the smoother consonants. In general, the Bohemian has a natural melody like that of the Greek.

The Bohemian language, moreover, has much expressiveness and energy, as it is not weakened by a number of articles, auxiliary words, conjunctions, and words of transition, but is able to represent the objects of imagination, of passion, and all the higher emotions of the poet and orator, in a lively manner; by its brevity, heaping together the most significant words, and arranging the connection of the parts of speech according to the degree of feeling to be expressed, so as to give the style, spirit, and energy, or gentleness and equability. Like various other tongues, it designates many objects by imitation of natural sounds. Thus the names of many animals are taken from their voices, as *kruta*, the turkey; *kachna*, the duck. Many plants are named from their effects, as *bolchlaw*, hemlock (from headache). The conciseness of the language is increased by the absence of auxiliaries in the greater part of the verbs. The preterites, in the third person singular and plural, express a meaning still further condensed, as the variation in the last syllable is made to designate the sex; for example, *psal*, *psala*, *psalo*, he, she, it, has written; *psali*, *psaly*, *psala*, they have written. In like manner the Bohemian saves many prepositions and much circumlocution of other kinds, by the use of the *instrumental*, agreeing with the Latin ablative; for instance, *seccenjm mcece hlavcu mu st' al* (*t* read like *te*), "with a blow of the sword he has cut off his head." This language is, therefore, very well fitted for the translation of the Latin classics. By the use of the past participle active the Bohemian can designate, as well as the Greek, who has really performed the action contained in the predicate of the accessory clause, which the Latin, with its ablative absolute or participle passive, must leave always undefined and dubious. The same kinds of actions performed with different implements are often expressed by peculiar words; for example, the verbs *ziti*, *strjhati*, *krágeti*, *rezati*, denote to cut with the scissors, with the sickle, with the knife, and with the scythe. In the subtlety of grammatical structure the Bohemian is like the Greek, and has the advantage over the Latin and other languages. In speaking of two hands, two eyes, etc., the dual number is used; for example, *ruce*, *oci*, etc. The language is also capable of expressing the idea of duration, referring to an indefinite past time, like the Greek aorist; for instance, *kupowal dum*, *ale nekaupil ho*, he was engaged in buying the house, and did not buy it. The language affords several preterite tenses,

distinguished with great subtlety, as *kaupil*, he has bought once; *kupowal*, he had purchased for a long time; *kupowáwal*, he had purchased formerly several times; *kupowáwáwal*, he seldom had purchased in former times; moreover, by adding the auxiliary verb *byl*, a time still longer passed may be expressed, though this is very seldom used; for instance, *byl kupowáwal*, he had purchased in times long past. Another advantage of the language consists in the various future tenses by which the Bohemian denotes not only the time but also the duration, and the more or less frequent repetition of the action; for instance, *kaupjm*, I shall purchase once; *budu kupowati*, I shall be purchasing for a long time; *budu kupowáwati*, I shall purchase several times; and *budu kupowáwáti*, I shall be purchasing very often. Not less manifold in signification, and equally subtle in the determination of time, are the participles and the participial constructions. The determination of sex and number by the final syllable of the participle gives the Czech language no small advantage over others. Small connective particles of speech the Bohemian has in common with the Greek. The Greek *alla*, *men*, *gar*, *de*, *te*, etc., agree with the Bohemian *cle*, *pak*, *wsak*, *li*, *z*, *t'*; only the three latter are always affixed to a word. Finally, the free, unrestrained arrangement of the words contributes much to perspicuity, as the Bohemian is less fettered than almost any other modern language to a particular order.

Bohemian Literature has been divided historically into five periods. The first extends from mythological times to 1409. It affords no written documents of remote antiquity. We know, however, that the language at an early period was similar to the present from the names of the gods, dukes, rivers, cities, and mountains which have been preserved, such as Perun, Przemysl, Borzwog, Wltawa, Bila, Praha, Tetin. The Salvonian apostle Method, and the philosopher Constantine, called *Cyril*, made the Slavonians in Moravia acquainted with Christianity. Thence it penetrated to Bohemia, and thus the people of this country received the Græco-Slavonic ritual in the year 845. The same Constantine invented for the sounds of the Slavonic language the Cyrillo-Slavonic alphabet, borrowed mostly from the Greek. In later times the Glagolitic alphabet sprang up, of which, however, less use was made. When the Latin Church supplanted the Greek in Moravia and Bohemia, the Latin alphabet came also into use instead of the Cyrillic. In Bohemia the Cyrillic character remained in use only with the monks of Sazawa, who observed the Slavonic ritual. As the Latins endeavored to annihilate all the writings of the old ritual, and the Slavonic language was, in many cases, obliged to give way to the Latin, Bohemian literature suffered incalculable injury; hence we possess from the earlier centuries but a few insignificant remains in the characters above-mentioned. In the 10th century the Bohemians had a school at Kudet, in which they learned Latin. Their most ancient relic is the hymn (*Hospodine Pomiluyny*) of Bishop Adalbert (*Wegtech*), a native Bohemian, sung to the present day even by the Russians and Poles. The Bohemians possess some remains of a collection of lyric-epic national songs, without rhyme, which seem to have been of great merit. The manuscript appears to have been written in 1290 and 1310. Goethe

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found these national songs worthy of particular attention. Under the Emperor Charles IV., who promoted the cultivation of the Bohemian language, the University of Prague was founded in 1348. In the Golden Bull he commanded the sons of the German electors to learn the Bohemian language. Under his son, the Emperor Wenceslas, all decrees were written in Bohemian, which formerly were in Latin. Prague was then not only the most populous city in this part of Europe, but also, on account of its splendid court and the wealth of its citizens, the centre of the arts and sciences. Almost all the intellectual currents of the West found entrance into Bohemia, and German literature in particular had a powerful influence. The heroes of the Alexandrian and Arthurian cycles of romance became familiar to the Czechs in their own language. Dalimil Mezericky wrote a history of Bohemia in verse; Ondrej Z. Dube, a collection of Bohemian laws, in three volumes; Warinec Z. Brezowa, a history of the Roman emperors, and translated Mandeville's 'Travels'; and Pribik Pulkawa, a Bohemian history. This period affords also many vocabularies, poems, songs, and translations.

With Huss began the second period, from 1409 to 1500. The prevalence of religious disputes caused the Bible to be generally read and understood. Huss of Hussinetz translated Wickliffe's book, 'Triologus,' into the Bohemian tongue, and sent it to the laymen as presents. The 'Treatise of the Six Errors' he caused to be inscribed in Bohemian on the walls of the chapel of Bethlehem. He wrote his first collection of sermons when at the castle of Kozy (1413), besides an 'Appeal to the Pope,' 'Commentary on the Ten Commandments,' an 'Explanation of the Twelve Articles,' two sermons on the Antichrist; the 'Triple Cord,' and several excellent hymns. His letters from the dungeon in Constance to the Bohemians were translated by Luther into Latin, accompanied with a preface, and printed at Wittenberg in 1536. He and Jakobellus and Jerome improved and distributed the Bohemian Bible, of which several copies have been preserved to our times. Of Ziska of Trocnaw, one of the greatest generals in history, several letters and his rules of war have been preserved. From this period have come down to us, several war songs of the Taborites, also some songs of Prague. Martin Lupac undertook, with the assistance of some learned men, the labor of retranslating the whole New Testament. The church service was now performed entirely in the Bohemian language. Mladienowic, an eye-witness of the execution of Huss, wrote an account of his life. This used to be read in the Bohemian churches. Procopius continued the rhyming chronicles of Dalimil. Lodkowic related his 'Journey to the Holy Sepulchre,' Sasek of Mezhyor wrote 'Notes and Travels Through Germany, England, France, Spain, Portugal, and Italy of the Bohemian Baron Loew of Rozmital and Vlatna' (whom he accompanied), a contribution to our knowledge of the manners of the 15th century, published in a German translation at Brunn (1824). M. Gallus, Albjk, Chrislan, Zidek, J. Cerny, J. Blowic, and Sindel, wrote on medicine, astrology, and agriculture. As early as 1447 we have an anonymous work on the grafting of trees. We have also the rhyming legend of the 10,000 knights, a translation of the fables of Æsop, the

council of the beasts and birds, in prose and verse, in three volumes (Placj Rada). Each lesson, which flows in rhyme from the mouths of the animals, is preceded by the natural history of the animals and the moral. It was printed three times in the Bohemian language, and published at Cracow in Latin verse (1521, 4to). Of the Bible 14 translations have come down to us, besides 10 of the New Testament. The oldest, of the year 1400, is in Dresden. The typographic art made a rapid progress in Bohemia. The first printed work was the Epistle of Huss from Constance, in 1459; the second, 'The Trojan War,' in 1468; the third, a 'New Testament,' in 1474; the whole Bible, in 1488; the first almanac, in 1489.

The third age, from 1500 to 1620, may be called the golden age of the Bohemian language. The cultivation of learning—in other countries, with only a few exceptions, the monopoly of the clergy—was in this favored land open to the whole nation. All branches of science were elaborated, and brought to an uncommonly high degree of improvement for that time. Gregory Hruby of Geleni translated the work of Petrarch 'De Remediis utriusque Fortunæ.' W. Pisecky translated from the Greek the 'Exhortation of Isocrates to Demonikos.' John Amos Comenius wrote 54 works, some of which were very excellent. He published his 'Janua' and an 'Orbis Pictus,' which were translated in his lifetime into 11 languages, have passed through innumerable editions, and are not yet surpassed. In all the north of Europe Comenius attracted attention by his projects for improving education, which were deliberated upon even by the diet of Sweden and the Parliament of England. The hymns of this and the earlier ages, part of which have been translated by Luther, may serve as standards for all languages. In Prague alone there were at this period 18 printing presses, in the country towns of Bohemia 7, and in Moravia also 7; many Bohemian books, too, were printed in foreign countries, as in Venice, Nuremberg, Holland, Poland, Dresden, Wittenberg, and Leipsic.

The fourth period begins with 1620 and ends with 1774. After the battle at the White Mountain, the whole Bohemian nation submitted entirely to the conqueror. The population of most of the cities and of whole districts migrated in order not to be false to their faith. More than 70,000 men, and almost the whole of the nobility, all the Protestant clergy, scholars, and artists, in general the most cultivated part of the nation, left their native country. Of these emigrants the greater part formed the flower of the army of Count Mansfield. Hence the Thirty Years' War depopulated Bohemia more than any other country, since these fugitives endeavored to regain their native country by repeated invasions. The fugitives established at Amsterdam, Dresden, Berlin, Breslau, and Halle printing presses, and sent to their brethren in Bohemia, Moravia, and Hungary a number of books, mostly new editions. Some Bohemians who observed the decay of their language strove to remedy it; as Pesina Z. Cechorodu; Joh. Beckowsky, who continued the Bohemian history to 1620; W. Weseley, who wrote a work on geometry and trigonometry, etc.; but the decay was too great to admit of being checked; the nobility had become strangers, and the government encouraged only German literature. From this time, there-

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fore, the Bohemians wrote more in the German language.

In the fifth period, from 1774 to the present time, a new ray of hope shone on Bohemian literature, when, under the Emperor Joseph II., a deputation of secret Bohemian Protestants, trusting to his liberal views, made him acquainted with the great number of their brethren of the same faith. He perceived the necessity of introducing toleration, and hundreds of thousands of Protestants in Bohemia and Moravia came to light: their concealed works were printed anew, their classical language was again acknowledged and cultivated. Under this protection many men of merit, mindful of the fame of their ancestors, endeavored to cultivate anew all branches of the sciences, and to rival, if possible, the results attained by their more advanced neighbors. From about the year 1820 great activity was manifested by the Bohemian writers in the various departments of literature. A little before this Milton's 'Paradise Lost' was translated into Bohemian, and subsequently Shakespeare's dramas, or most of them, were likewise translated, the native drama being also cultivated. Kollar and Chelakovsky distinguished themselves in poetry, and perhaps even more Hynek Macha, whose poem "May" is said to still maintain an influence over Bohemian poetry. Kollar and Chelakovsky were advocates of the Panslavic movement. The chief work of the former was 'Slava's Daughter,' a long lyrico-epic poem. Several writers became well known as novelists, some of them following the lead of Sir Walter Scott. Jungmann (the translator of Milton), brought out a valuable 'History of Czech Literature,' and Schafarik his 'History of the Slavonic Language and Literature' and his 'Slavonic Antiquities.' Among more recent poets of note may be mentioned the names of Halek Heyduk and Neruda, but it must be admitted that few Bohemian writers have become generally known, even by name, to the European reading public.

Bohemond I., the son of the Norman adventurer Robert Guiscard, who rose to be Duke of Apulia and Calabria: b. 1056; d. 1111. He became familiar with warfare when a mere boy, took a prominent part in various expeditions to Greece and Illyria against Alexis Comnenus, and repeatedly defeated his troops with a very inferior force. As eldest son Bohemond naturally expected to succeed his father, but when the succession opened in 1085 Bohemond was absent in Greece, and his younger brother Roger, having obtained possession of the paternal inheritance, declared his determination to maintain it. A war between the brothers was followed by an arrangement which gave Bohemond nothing more than the principality of Tarentum. While assisting his brother at the siege of Amalfi he resolved to become a crusader, and without waiting to complete it he harangued the troops so effectually on the glory to be gained in the Holy Land that the great body of them at once joined his standard. Bohemond was soon on his march, and after encountering considerable difficulties reached the scene of action. The Crusaders had laid siege to Antioch, but had made little progress and were beginning to despair of success, when Bohemond found means to gain over an Armenian renegade, who undertook to introduce him and his men by night, and thus give them possession of the town. Bohemond

laid the matter before his fellow-chiefs, and in doing so stipulated that in the event of success he himself should be prince of Antioch. The Armenian kept his promise, and accordingly in 1098 Bohemond was installed in his sovereignty, which he retained ever after, and at his death transmitted it to his son, who assumed the title of Bohemond II.

Böhlag, bé'län, Helene, German novelist: b. Weimar, 22 Nov. 1859. She shows now and then a leaning toward the romantic school, but on the whole her high power of description is realistic and her writings are imbued with passion. Among her novels are 'Under Death's Ban' (1882); 'Guilty of a Pure Heart' (1888); 'In Fresh Water' (1891).

Bohlen, Peter von, pä'tér fön bö'lén, German Orientalist: b. Wuppels, Oldenburg, 9 March 1796; d. Halle, 6 Feb. 1840. He spent the first 20 years of his life in straitened circumstances, but his talents and perseverance attracted attention, and he obtained admission to the Hamburg gymnasium. He afterward studied the Eastern languages at Halle and Bonn; and he obtained an appointment at Königsberg, first in 1825 as extraordinary, and afterward in 1830 as ordinary professor of Oriental literature. Bohlen has left many works, which fully support his title to the high place which he held among Oriental scholars. One of the most important is a work entitled 'Das alte Indien' (1830-1), not yet superseded by any other work on the same subject. The details of his life are given with great minuteness and honesty in an 'Autobiography' (1841), which is full of interest, and cannot be read without producing a full conviction that he was no less distinguished by his amiability in private life than by his literary acquirements.

Bohlen Lectures, a lecture course established in 1875 on a foundation of \$10,000 bequeathed by John Bohlen, a lay member of the Protestant Episcopal Church. They are delivered each year in Philadelphia, Pa., by eminent representatives of that Church. Among the most notable are those upon "The Influence of Jesus," by Bishop Brooks, and the "Fitness of Christianity to Man," by Bishop Huntington.

Böhm, bém, Theobald, Bavarian musician: b. Munich, 9 April 1798; d. Munich, 25 Nov. 1881. He is best known for his improvements in the construction and fingering of the flute. He wrote 'Ueber den Flötenbau und die neuesten Verbesserungen desselben' (1847), and 'Die Flöte und das Flötenspiel.'

Böhme, or Böhm, Jakob, yä'kōb bé'mé, one of the most renowned mystics of modern times: b. 1575, Altseidenberg, a village in upper Lusatia; d. Görlitz, November 1624. Boehme being the son of poor peasants, remained to his 10th year without instruction, and employed in tending cattle. Raised by contemplation above his circumstances, and undisturbed by exterior influences, a strong sense of the spiritual, particularly of the mysterious, was awakened in him, and he saw in all the workings of nature upon his mind a revelation of God, and even imagined himself favored by divine inspirations. He became afterward a shoemaker; and this sedentary life seems to have strengthened his contemplative habits. In 1594 Böhme became a master shoemaker in Görlitz, married, and continued a shoemaker during his life, but with-

drew himself more and more from the world. If we take into view his retirement, his piety, his rich and lively imagination, his imperfect education, his philosophical desire for truth, together with his abundance of ideas, and his delusion in considering many of those ideas as immediate communications of the Deity, we have the sources of his doctrine and his works. His first work, 'Aurora, oder die Morgenröte,' was written in 1616, and contains his revelations on God, man, and nature. This gave rise to a prosecution against him; but he was acquitted, and called upon from all sides to continue writing. One of his most important works is 'Description of the Three Principles of the Divine Being.' His works contain profound and lofty ideas, mingled with many absurd and confused notions, but the basis of his thought is the theory that everything exists and becomes intelligible only through its opposite. The first collection of his writings was made in Holland in 1675 by Henry Betke; a more complete one in 1682 by Gichtel (10 vols. Amsterdam), from whom the followers of Böhme, a religious sect highly valued for their silent, virtuous, and benevolent life, have received the name Gichtelians. Another edition appeared in Amsterdam in 1730 under the title 'Theosophia Revelata,' (2 vols.); the most complete in six volumes. In England, also, Böhme's writings have found many admirers. William Law published an English translation of them, two volumes. A sect, taking their name from Böhme, was likewise formed in England, and in 1697 Jane Lead, an enthusiastic admirer of his, established a particular society for the explanation of his writings, under the name of the Philadelphists. In very recent years his views have taken on fresh importance, his fundamental principle having been perceived as akin to that underlying the philosophical systems of Spinoza, Schelling, and Hegel. See Hartmann, 'Life and Doctrines of Böhme' (1893).

Bohn, bôn, Henry George, English publisher, of German parentage: b. London, 4 Jan. 1706; d. Twickenham, 22 Aug. 1884. On completing his education he worked for a time under his father, but about 1831 started business on his own account as a second-hand bookseller, and in 1846 he began the issue of his famous libraries. The first of these was the Standard, succeeded in the following year by the Scientific and the Antiquarian, in 1848 by the Classical, and from then till 1853 by the Illustrated, the Shilling, the Ecclesiastical, the Philological, and the British Classics libraries. The whole number of volumes contained in these series exceeded 600. In 1864 and subsequent years he sold all his copyrights and other business property, thus realizing a sum of nearly \$500,000. Among his own works were: 'The Origin and Progress of Printing' (1857); 'Biography and Bibliography of Shakespeare' (1863); 'Dictionary of Quotations' (1867); 'Handbook of Proverbs'; 'Handbook of Games'; 'Guide to the Knowledge of Pottery and Porcelain'; and editions of Lownde's Bibliographer's Manual and Addison's Works.

Bohol, bô-hôl', Philippines, an island belonging to the Visayas or Bisayas group. It has an area of about 1,300 square miles and an estimated population (1900) of 245,000. Sugar-cane is grown and the island is reputed rich in

gold deposits. The most important town is Tagbilaran, a port on the southwest coast. In the north is Calape. These ports were officially declared open to commerce 11 Dec. 1899. The Visayas dialect prevails throughout Bohol.

Bo'hor, an east African antelope (*Cervicapra bohor*), one of the reitboks (q.v.).

Böhntlingk, bêt'link, Otto von, German Sanskrit scholar: b. St. Petersburg, 11 June 1815. He received his education in his native city, and in 1853 removed to Germany. In 1842 he returned to St. Petersburg and resided there many years, but subsequently lived much in Jena and Leipsic. His chief work is a Sanskrit-German dictionary in seven volumes, prepared in conjunction with Prof. Roth of Tübingen (1853-75). In 1879-89 he issued a smaller edition giving the meanings (with considerable additions), but omitting the quotations.

Boiardo, Matteo Maria, mǎ-tǎ'ô mǎ-ré'a bô-yâr'dô (COUNT OF SCANDIANO), Italian poet: b. near Ferrara, 1434; d. Reggio di Modena, December 1494. From 1488 to 1494, the period of his death, he was commander of the city and castle of Reggio, in the service of his protector, Ercole d'Este, Duke of Modena. This accomplished courtier, scholar, and knight was particularly distinguished as a poet. His 'Orlando Innamorato' (1496) is continued to the 79th canto, but not completed. He immortalized the names of his own peasants and the charms of the scenery at Scandiano in the persons of his heroes and his descriptions of the beauties of nature. In language and versification he has been since surpassed by Ariosto, whom he equaled in invention, grace, and skilful conduct of complicated episodes. Domenichi, Berni, and Agostini new modeled and continued the work of Boiardo without improving it. One continuation only will never be forgotten — the Orlando of Ariosto. In some of his works Boiardo was led by the spirit of his times to a close imitation of the ancients — for example, in his 'Capitoli'; also in a comedy borrowed from Lucian's 'Timon'; and in his Latin eclogues and translations of Herodotus and Apuleius. In his sonnets and *canzoni* (first printed at Reggio, 1499) he has displayed great talents as a lyric poet.

Boiars. See BOYARS.

Boieldieu, Adrien François, ä-dre-ën frāñ-swǎ bwāl-dyē, French composer of distinction: b. Rouen, 15 Dec. 1775; d. Groshois, 8 Oct. 1834. He early displayed great musical talent, and at 18 wrote an opera, 'La fille coupable,' which was performed with great applause. In 1795 he went to Paris, and rose rapidly in reputation, producing several operas and various other pieces which have become classical. Such as 'Le deux lettres'; 'La famille Luisse'; 'Calife de Bagdad'; and 'Ma tante Aurore.' When the Conservatoire de Musique was established he was nominated a professor. In 1803 he went to Russia as *maitre de chapelle* to the Emperor Alexander, but returned to Paris in 1811, and subsequently composed 'Jean de Paris' (1812); 'Le chaperon rouge' (1818); 'La Dame blanche,' his masterpiece (1825); 'Les deux nuits' (1829). The 'Calife de Bagdad'; 'Jean de Paris,' and 'La Dame blanche' still hold the stage and continue popular.

Boies, Horace, American lawyer: b. Aurora, N. Y., 7 Dec. 1827. He went to Wisconsin in 1844; and after working on a farm returned, studied law and was admitted to the bar in 1849. He practised at and near Buffalo till 1867, becoming active in Republican politics during this period; and in the last year removed to Waterloo, Iowa, where he continued law practice. His opposition to the tariff and prohibition policy of the Republican party caused him to unite with the Democrats; and, in 1890-4, he served two terms as governor of Iowa, being defeated for a third term in 1893. He was a conspicuous candidate for the presidential nomination in the National Democratic conventions in 1892 and 1896; and in the campaign of 1896 he supported Bryan.

Boii, bōi-i, a Celtic people, who at first inhabited Transalpine Gaul. Their original seat is supposed to have been between the upper Saône and the higher parts of the Seine and Marne. They migrated to Cisalpine Gaul, crossed the Po, and established themselves between it and the Apennines, in the country previously occupied by the Umbrians. They are found, 396 B.C., engaged along with the Insubres and the Senones, two other tribes of Cisalpine Gaul, in the capture and destruction of Melpum, a neighboring city, of which the site and history are unknown. They united their forces with the Etruscans, 283 B.C., after the defeat of the Senones, and were defeated by the Romans at the Vadimonian Lake, the scene of a previous defeat of the Etruscans. After another defeat they made a peace with the Romans, which was preserved for 45 years, when the occupation of the territory of the Senones by the latter led to another war, in which the Boii were again defeated. At the commencement of the second Punic war, 218 B.C., they again attacked the Romans and supported Hannibal. From this period they were engaged in almost constant war with the Romans till they were completely subdued by Scipio Nasica, 191 B.C. Many of them were put to the sword; the remainder were at length compelled to migrate, and crossing the Alps found a refuge among the Tauriscans, a kindred tribe in the territory of modern Bohemia, to which the Boii have given their name. They were afterward driven out or exterminated by the Dacians (some say the Marcomans). Part of them migrated about 58 B.C. to Bavaria. The Boii, like the other Gauls, were a people of considerable civilization, possessing a strong love of independence, and formidable from their military disposition and virtues.

Boil, a superficial or deep localized inflammatory process of the skin leading to the destruction of tissue and the formation of pus. In practically all instances some form of infection by a micro-organism, usually the *Staphylococcus pyogenes aureus*, is present in boils. In the superficial varieties, the bacteria enter the hair follicles or the sebaceous glands and travel down beneath the skin and here either set up a process of destruction or continue one already begun by a wound. There results a local swelling; with exquisite tenderness, and later a pointing and discharge of the purulent detritus from the boil. In the deep-seated varieties similar processes are in action, but the heading and discharge of the boil is de-

layed. The marked tenderness is due to the involvement of the nerve fibres in the tissues immediately surrounding the inflammatory centre. The predisposition to the formation of boils varies widely, some people being particularly prone to them. They are apparently more liable in those who are "run down," or in those whose tissues are non-resistant. Boils are of commoner occurrence following the winter time of housed individuals, combined with the renewed activities of the skin in the warm spring atmosphere, and they occur following the depressed states of many diseases, and particularly as a result of excessive athletic exercise, "over-training." Faulty diet and hygiene are responsible for many of them. In their treatment attention to the intestines is imperative. Tonics, particularly those containing some forms of sulphur, are of value. Proper hygiene of the skin is imperative. For the immediate treatment heat is helpful. This is usually applied as a hot flax-seed poultice, preferably, combined with a mild antiseptic; two per cent carbolic acid, being excellent. Early and complete incision is also advisable. See CARBUNCLES.

Boileau Despréaux, Nicolas, nik-ō-lā bwā-lō-dā-prā-ō, French poet of distinction: b. Paris, 1 Nov. 1636; d. there, 13 March 1711. He applied himself at first to the study of the law and afterward of theology, but devoting himself eventually to the pursuit of literature, he produced, within the space of 40 years, a vast number of works, the most important of which is that on the art of poetry, establishing an æsthetic code for all forms of poetical composition. His satirical poem, 'Le Lutrin,' and the 'Dialogue des héros de roman,' must also be particularly mentioned. His other writings comprise translations of the classics, miscellaneous effusions on art, music, and poetry, and his famous epistles, of which those treating of 'Le respect humain,' 'La connoissance de soi-même,' and 'Plaisirs de la campagne' are the best. When Boileau began to write, Montaigne, Pascal, Malherbe, Corneille, Molière, La Fontaine, and other eminent authors, had already made their appearance; yet the people were slow to appreciate the genius of the new school, to which they preferred the previous mediocre and imitative writers. Boileau's great achievement was to cure this perversion of taste. Like his friend Racine, he was historiographer of Louis XIV., and the recipient of an annual pension of 2,000 francs. His admission to the French Academy did not take place before 1684, owing to his attacks upon some of the members. The latter part of his life was passed in neglect and troubles, which accelerated his death. He left the reputation of a genial, high-minded, and generous man. The best edition of his works is by Gidel (1870-3). See Deschanel, 'Le romantisme des classiques,' 4th series (1888); Faguet, 'XVII. Siècle, Etudes littéraires' (1887); Hemon, 'Cours de littérature' (1889-95); Lanson, 'Boileau' (1892); Morillot, 'Boileau' (1892).

Boiler, in steam engineering, a closed vessel for the generation of steam under pressure. In days when steam pressures did not exceed a few pounds to the square inch, many forms of boiler were used, that are now out of the question, on account of the intrinsic weakness of their forms. At the present time,

BOILER

when steam pressures are often carried as high as 150 or 250 pounds to the square inch, the strictest attention must be paid to every trifling detail of design and construction, in order to ensure the safety of the structure. The fanciful shapes that prevailed in the days of Watt and other early steam engineers have perforce disappeared, and given place to a limited number of standard types that have been found to be capable of withstanding the severe conditions of modern practice. The types at present in use may be divided into two general classes, according as they are "internally fired" or "externally fired"; that is, according as the fire which furnishes the energy for the formation of steam is contained within the general contour of the boiler, or is situated externally to it. Internally fired boilers are the rule in England, but a large majority of the boilers in use in the United States are fired externally.

Internally Fired Boilers.—The Cornish and Lancashire boilers are the commonest internally fired types. Each consists of a cylindrical shell with flat ends or "heads." In the Cornish type the boiler is traversed from end to end by a large flue, which is often corrugated, to increase

smaller size of its flues. The Galloway boiler does not differ in any essential particular from the Cornish or Lancashire types, except that its flues are crossed by conical-shaped water tubes, which serve the double purpose of increasing the heating surface, and of stiffening the flues that they traverse. The conical shape is adopted for the cross-tubes chiefly on account of the ease with which tubes of this form can be put in position, by passing the flange of the smaller end through the opening to which the larger end is to be riveted.

The Scotch, or cylindrical marine boiler, shown in Fig. 1, is a very common type in marine practice. It contains several furnaces (three in the illustration), which are usually corrugated. These furnace-flues do not pass through the entire length of the boiler, as in the Cornish and Lancashire types, but each is connected, within the boiler, to a separate "combustion chamber." The products of combustion pass from the furnace back into the combustion chamber, and then return to the front end of the boiler through banks of small tubes which occupy the water space of the boiler, above the furnace. A "breaching" (or hood) of sheet steel, secured to the front of the boiler, then receives them, and conducts them to the stack.

Among the kinds of internally fired boilers that are more familiar to the engineers of the United States, the vertical tubular boiler and the locomotive boiler deserve special mention. The vertical tubular boiler consists of a cylindrical shell, with flat heads at the top and bottom, and traversed by a large number of small vertical tubes. The Manning boiler, shown in Fig. 2, is a good example of this type. At the lower end, the shell of this boiler is enlarged to provide a greater space for the fire-box than could be had if the shell were of the same diameter all the way. Another object that the designer had in view, in increasing the diameter of the shell in this way, was to give the boiler a certain degree of elasticity. The tubes are often hotter, in service, than the outer shell; and hence they tend to expand more, and thus throw stresses upon the heads and the tube ends. The reversed flange by which the main shell is secured to the fire-box is supposed to yield sufficiently, under the bending stress thus thrown upon it, to relieve the more vulnerable parts of the boiler from the expansion strains to which they would otherwise be subjected. The fire-box of the Manning boiler is surrounded by an annular space containing water, the inner plates of this space (or "water leg") being secured to the outer ones by screw stay bolts that are spaced evenly, at short distances, so that they form the corners of a system of small squares. These bolts are supposed to be screwed into each of the shells of the water leg, and afterward riveted over at both ends. They are also commonly made hollow, or drilled through lengthwise with a small hole, so that if one of them should break or corrode away seriously, the escaping steam or water would attract the attention of the fireman. Vertical tubular boilers are particularly useful when the available floor space in the boiler room is small; but they are often hard to clean out, and hence are not to be recommended when the water supply is known to form considerable deposits of scale matter. Such scale matter, in whatever part of

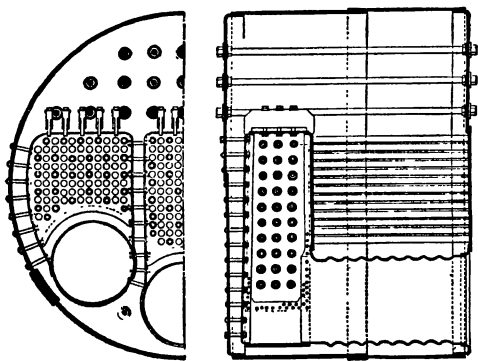
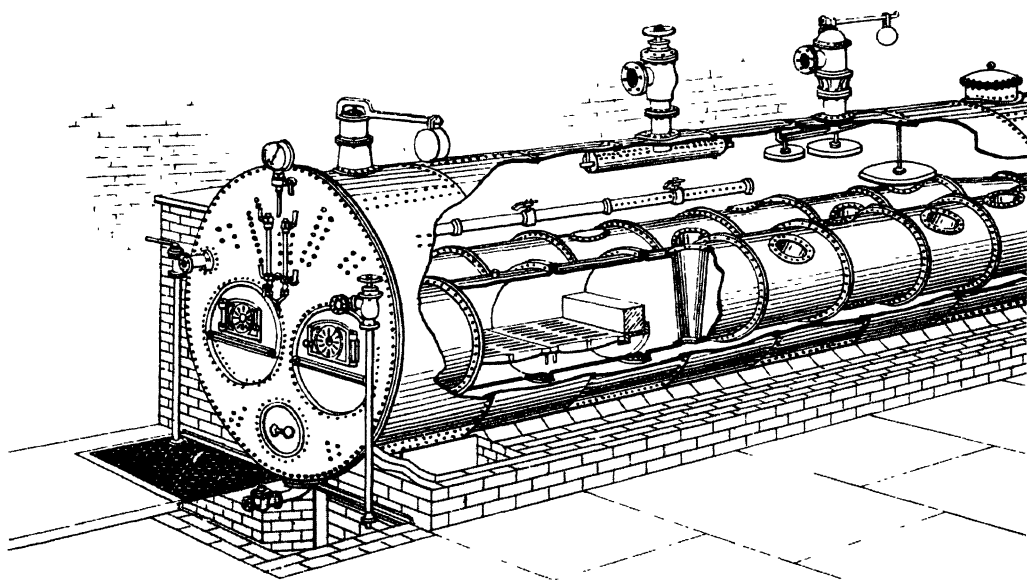
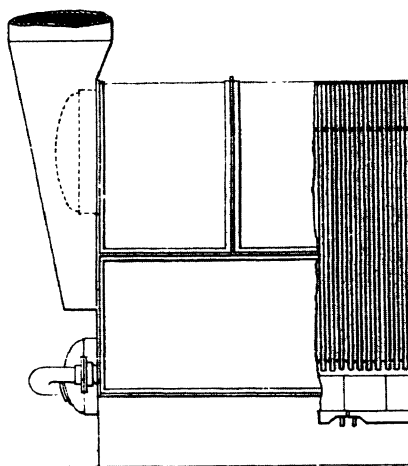
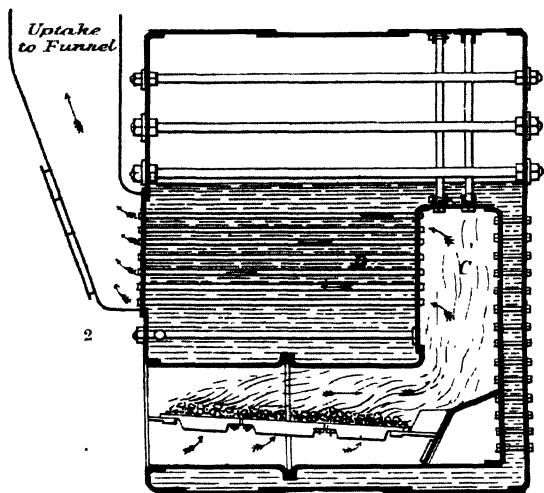
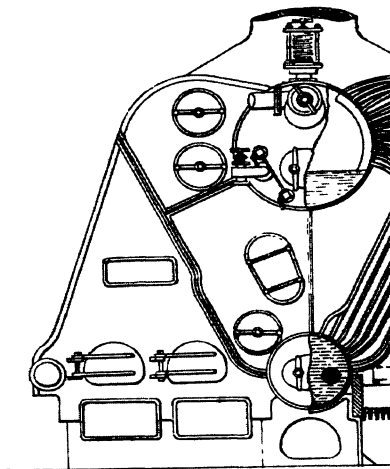
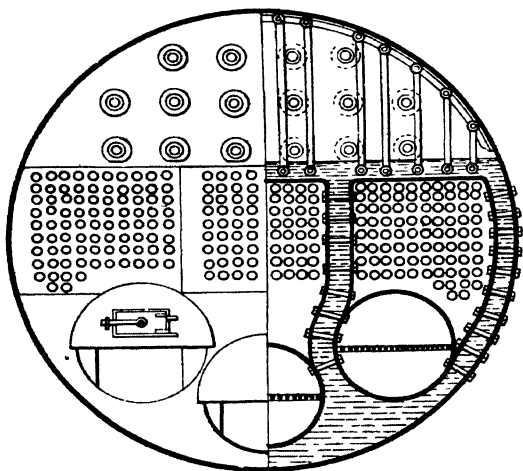


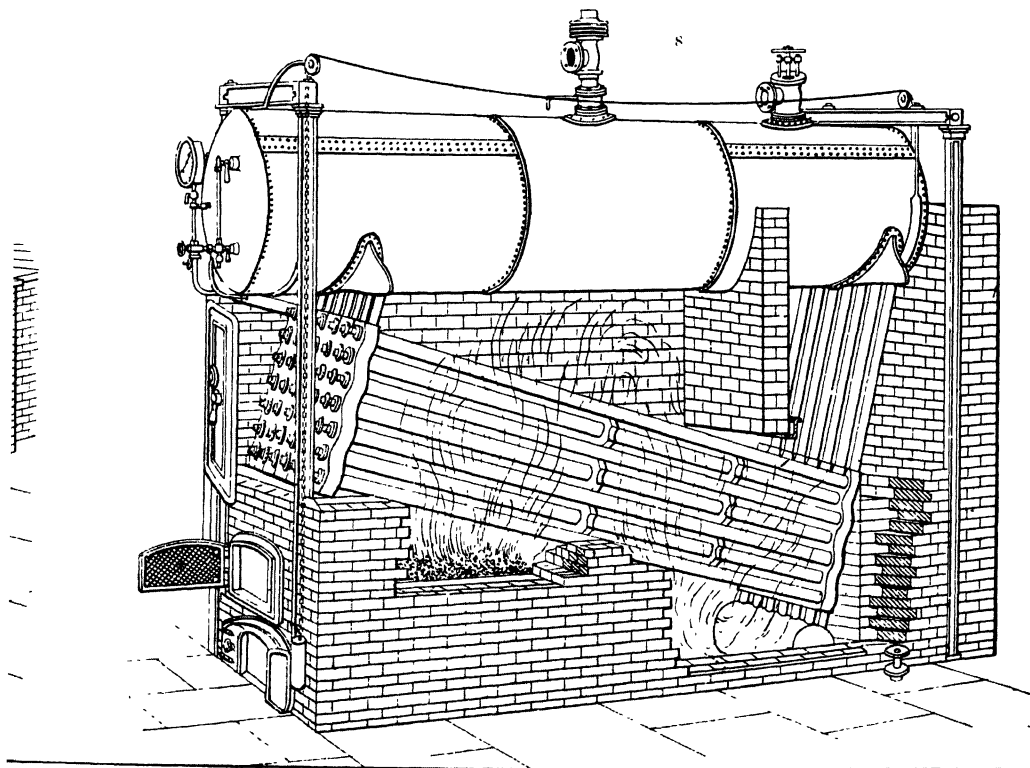
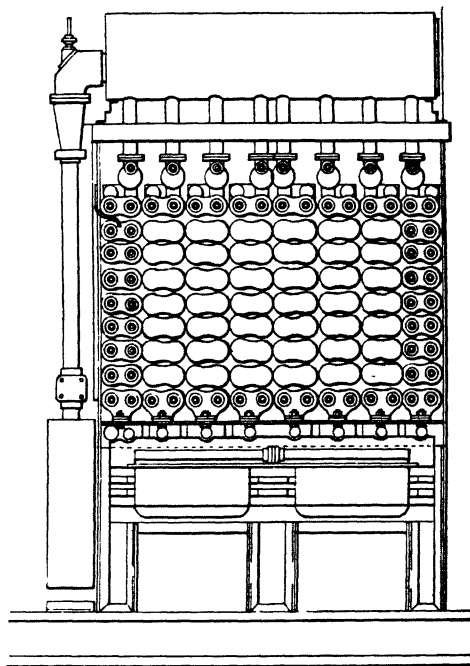
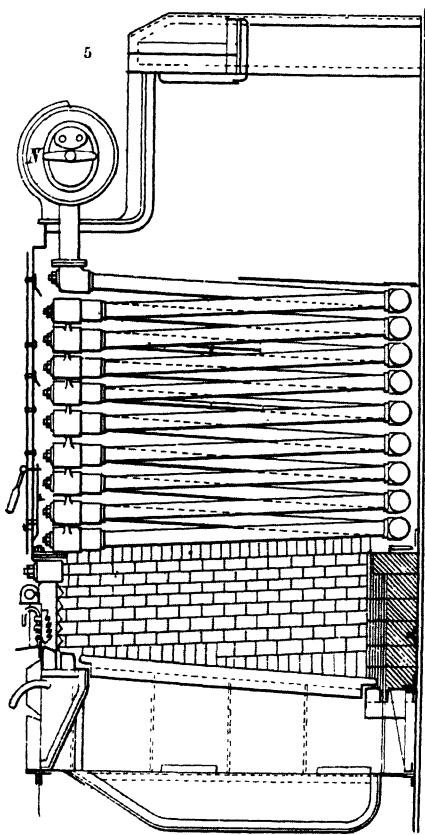
FIG. 1. The "Scotch," or Cylindrical, Marine Boiler.

its strength. The fire is built within this flue, upon a suitable grate at one end of the boiler; and the gaseous products of combustion, after passing through the flue, are returned along the outside of the shell, so as to give up still more of their heat to the water in the boiler. The large flue in the Cornish type is an element of weakness, since the tendency of a flue to collapse through the action of an external pressure increases very rapidly with the diameter of the flue. To guard against collapse, the long flue is often provided with strengthening rings, which are riveted to it externally at short intervals. The Lancashire boiler differs from the Cornish type chiefly in having two comparatively small flues in the place of a single large one. Such a construction is intrinsically stronger, and since there is a fire in each of the flues, the fuel can be replenished, and the fires cleaned, alternately. This implies a greater steadiness of pressure, and less strain upon the boiler from the chilling action of the comparatively cold air that enters and strikes against the heated flue-walls when the fire doors are opened. The Cornish boiler is cheaper to build, and the Lancashire boiler is harder to fire, owing to the



Figs. 1, 2 Common Type of Cylindrical Boiler.

3, 4 Thornycroft Boil



6. 6 Belleville Boiler.

7 Lancashire Boiler.

8 Babcock & Wilcox Boiler.

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the boiler it is formed, will eventually fall upon the lower tube sheet, or else into the water leg. That which falls into the water leg will do no great harm unless it is allowed to accumulate to an unreasonable extent. Handholes are

on the same level as the lower tube sheet, for a like purpose; but it is not so easy to remove the scale from this sheet as it is to remove it from the water leg. That which lodges around the edges of the tube sheet can be removed without any great trouble, but the deposit that lies toward the middle of the tubes can hardly be got at from the handholes. Yet it is of the highest importance that the tube sheet should be kept free from such deposits, because otherwise the ends of the tubes will become overheated and loosened, and serious mischief, or even disastrous explosion, may follow.

The locomotive boiler is built in a great variety of forms and proportions, but the fundamental principles of design are substantially the same in most of them. Like the vertical tubular boiler, it has a fire-box that is surrounded by a water leg on all sides, though it is open at the bottom for the discharge of ashes, and for the admission of air for combustion. The inner and outer walls of the fire-box are connected by stay-bolts, and the upper sheet of the furnace (technically known as the "crown-sheet") is supported in some efficient manner, so that the pressure of the steam shall not force it down out of position. The support thus necessary for the crown-sheet is sometimes afforded by running "sling stays" from it to the neighboring parts of the outer shell, and sometimes by providing parallel, horizontal girders over the sheet, these being secured to the crown-sheet, at short intervals, by means of hangers or long, thimble rivets. Not infrequently these two methods of support are combined in the same boiler, as suggested in the illustration (Fig. 3). The products of combustion pass forward from the furnace, through a bank of small tubes that conduct them to a "smoke-box" or "extension" at the front end, to which the stack is attached. When the locomotive type of boiler is used in stationary practice, the draft required for combustion is provided by a chimney or tall stack, as in other types of stationary boiler; but when used in railway service it is impossible to obtain the draft in this manner and a "blast-pipe" is therefore provided, through which the exhaust steam from the engine cylinders is discharged up the stack. The gaseous products of combustion are expelled from the "front extension" by the blast of steam, and an equivalent quantity of air is drawn up through the fire. The draft produced in this way is quite powerful. "Baffle plates" are therefore provided in the furnace, in many cases, to deflect the hot gases that come from the fire and bring them into contact with a considerable portion of the surface of the fire-box, before they pass out into the tubes. The weakest points about the locomotive type of boiler are the crown-sheet and the stay-bolting. If sediment lodges upon the crown-sheet, and thereby keeps the water from direct contact with the metal there, overheating is sure to occur, and the sheet may become so softened and burned as to lose its strength, tear away from its fastenings, and permit the entire contents of the boiler to be discharged into the furnace. Many of the explosions of locomotive boilers are due to this action. The stay-bolting at the sides of the fire-box is likewise a source of frequent trouble, because it is found that the stay-bolts sometimes corrode away very rapidly, so that they are in reality badly wasted and weakened

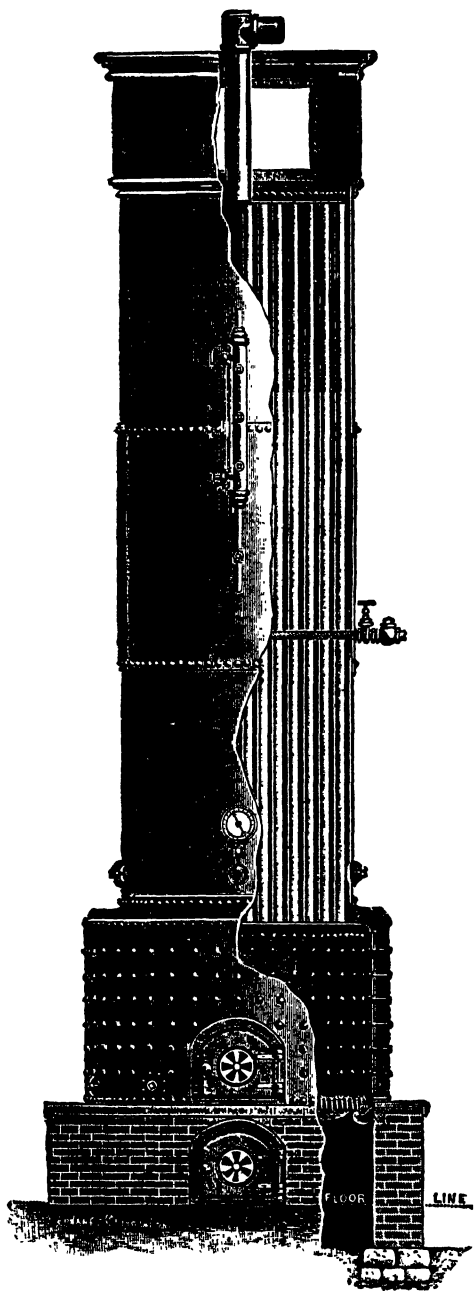


FIG. 2. The Manning Boiler.

provided along the bottom of the water leg, on the outer shell, and these should be opened as often as experience with the particular feed water that is used indicates to be necessary, and the water leg thoroughly freed from scale and mud. Handholes should also be provided

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when the engineer in charge believes them to be still sound and strong. As in the vertical boiler, the stay-bolts are made hollow so that they may automatically give notice of breakage by leaking. This artifice is helpful, but unfortunately it does not invariably work as it is intended to, and broken or badly corroded stay-bolts exist, not infrequently, without giving the alarm that they are supposed to give.

Externally Fired Boilers.—The commonest type of externally fired boiler, in the United States, is the horizontal tubular. The standard

underneath the boiler shell to the "combustion chamber" at the rear, after which they rise and return to the front end through the tubes. They then enter the "smoke box" at the front end, and finally pass upward into the flue that leads to the chimney. The weight of the boiler is sustained by means of cast-iron (or steel) projections, or "lugs," that are not shown in the illustration, but which are riveted to the shell, and rest upon the side walls of the brick setting. Three pairs of lugs are often provided, but two pairs are sufficient except when the

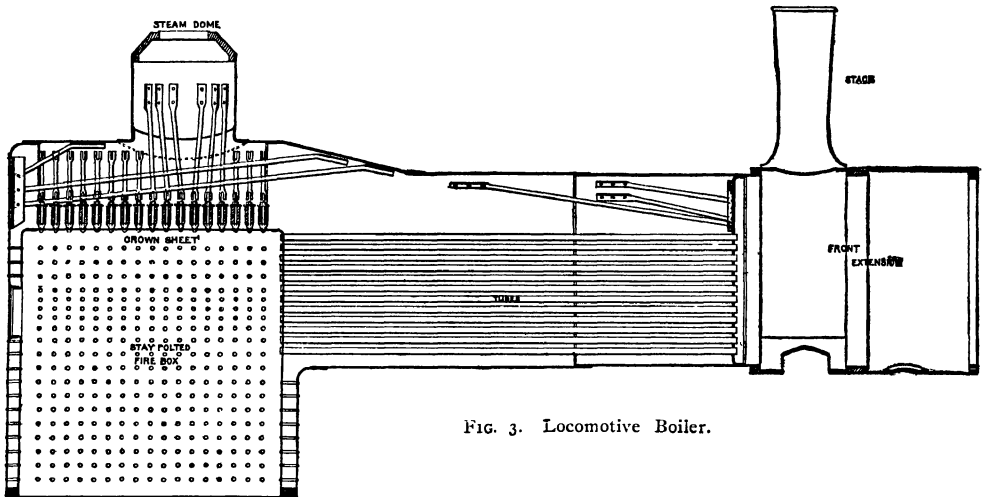


FIG. 3. Locomotive Boiler.

design of this boiler, according to the Hartford Steam Boiler Inspection and Insurance Company, is shown, with its brickwork (or "setting") partially torn away, in Fig. 4. It con-

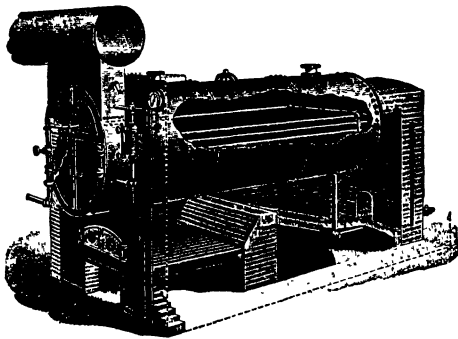
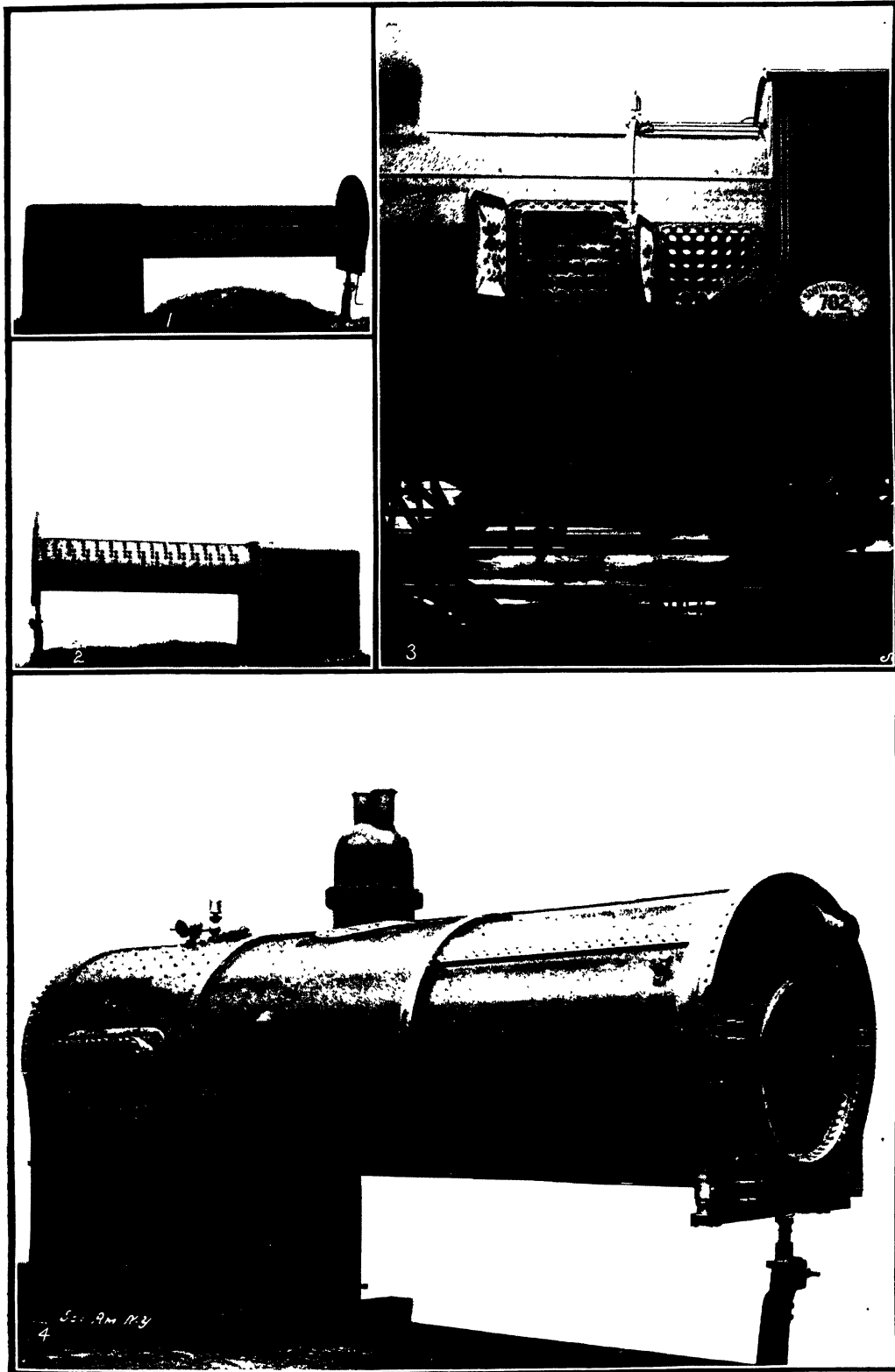


FIG. 4. Horizontal Tubular Boiler.

sists of a cylindrical shell, usually composed of three courses or "rings" of plates, riveted together. The circular joints in these boilers are almost invariably single-riveted; but the longitudinal joints are double-riveted, triple-riveted, or riveted in some even more substantial manner, according to the pressure that the boiler is to carry. The longitudinal joints, which are not shown in the engraving, should be high enough to be well out of the way of the hot gases from the furnace. A multitude of tubes extend through the boiler from end to end, and the furnace gases pass from the furnace back

boiler is very long; and two pairs can be brought to a good bearing upon the side walls more readily than three. The boiler should be "anchored" by the front pair of lugs, and the rear pair should be provided with rollers so that the boiler may expand and contract freely, without producing strains in the setting or in itself. The course of the feed-pipe, through which water is introduced into the boiler, is indicated quite plainly in the engraving. If there are several boilers set together in one battery, the main feed-pipe runs along the fronts, just under the projecting ends of the boilers. From this main feed-pipe a branch pipe is taken off for each boiler. The branch pipe is taken off on the left-hand side of the boiler, and near the main pipe it is provided with a ground union, or with a flanged connection. Immediately above the union there is a check valve, and above this is the globe valve which controls the feed. The feed pipe enters the boiler just above the tubes, and passes down the boiler on the inside, nearly to the back head. It then crosses over to the right-hand side, and discharges downward between the tubes and the shell. It is found by experience that when feed water is introduced in this way it becomes heated almost to the temperature of the water in the boiler before it is discharged, so that the annoying and often dangerous effects that are produced when the shell is chilled by cooler feed-water are entirely avoided. On large boilers the feed-pipe should have a diameter of at least an inch and a half. The blow-off pipe (which is used for drawing off the contents of the boiler) should be located at the rear end, and



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AN ENGLISH WATER-TUBE LOCOMOTIVE BOILER.

- ¹ View Showing Auxiliary Fire Tubes for stiffening Front End of Fire-box.
- ² Side Doors Open, Showing Cross Water-Tubes in Fire-box.
- ³ The Fire-box and Water-Tube Flue.
- ⁴ Complete Boiler, Showing

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should enter the boiler at the bottom, and not through the back head. To strengthen the construction, the shell should be reinforced where the blow-off enters it, by a ring of boiler plate securely riveted in place, about the point of attachment of the blow-off. The neglect of this simple matter of reinforcement has led to many serious accidents, through the blow-off pipe pulling out and permitting the contents of the boiler to be discharged through the opening so made. As the blow-off is exposed to the action of the fire, it is also important that it should be encased in some sort of a protecting sleeve, as indicated by the dotted lines. A piece of larger pipe, slipped over the blow-off, is often used for this purpose, but it has the disadvantage of rendering the blow-off itself inaccessible for examination. A piece of asbestos rope coiled about the pipe is equally satis-

straight passage through them, and are therefore likely to catch and retain pieces of scale, which often prove to be very troublesome impediments. It should be mentioned that those parts of the heads of a horizontal tubular boiler that lie above the tubes are intrinsically weak, and must therefore be sustained in some manner. The necessary support is usually secured by running braces from the heads to the side of the boiler shell, though sometimes the braces are run through the entire length of the boiler, from one end to the other.

The horizontal tubular boiler has many excellent points, not the least of which is that it is accessible for examination and cleaning in practically every part. No boiler can be expected to work ideally when the feed water is bad, but the horizontal tubular type gives as good service, even under this trying condi-

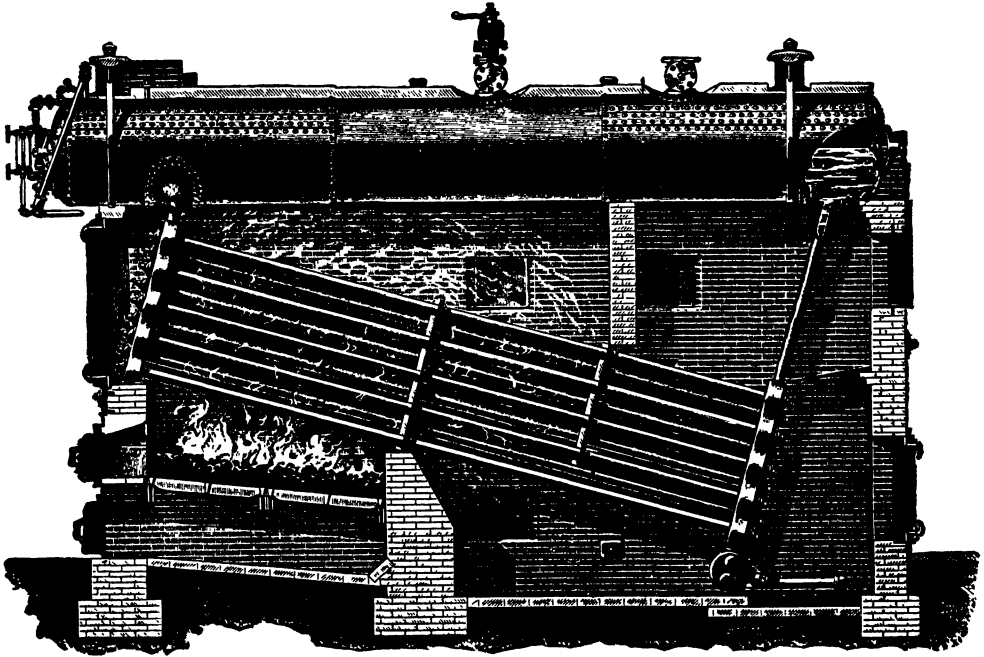


FIG. 5. The Babcock & Wilcox Water Tube Boiler.

factory, and permits of easy inspection of the pipe. The blow-off pipe of a boiler that is properly cared for is not likely to burn nor to become otherwise injured. Most of the accidents from the burning of such pipes have been primarily due to permitting the pipes to become choked up with mud or scale, so that water could not enter them freely from the boiler, to keep them properly cool. This may be almost certainly avoided by opening the blow-off (say) twice a day for a moment or two, until any sediment that may have fallen into it has been thoroughly swept out. The blow-off pipe is often so arranged that the elbow comes in the combustion chamber; but this is not good practice, and it is much better to carry the pipe down until it passes below the floor of this chamber. The pipe itself should be about two inches in diameter. It should be provided with a plug cock or with a gate valve, but a globe valve should never be used upon it, since valves of this type do not have a

tion, as can be had from any known type. Its weak points are (1) that it is not so well adapted to extremely high pressures as some of the water-tube types, of which one will be presently noticed; and (2) when it ruptures (as must happen occasionally with every type of boiler) the explosion is likely to be considerably more destructive than the explosion of a sectional boiler, because the large quantity of energy that it contains is liberated more suddenly.

Another class of externally fired boilers that is becoming more and more widely used, both in the United States and Europe, is the "water-tube" type, which is characterized by the fact that its tubular elements contain water, instead of serving for the transmission of the furnace gases, as in all the other forms that have been considered above. One of the best-known boilers of this class is the Babcock and Wilcox, which is shown in Fig. 5. This boiler is built up of lap-welded wrought-iron tubes, placed

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in an inclined position, and attached, both at the front and at the rear, to an upper drum that is made of extra thick steel or iron plates, and double-riveted, or riveted with a butt-strapped joint. The tubes are not vertically over one another, but are "staggered," so that each tube comes directly over a space in the row below it. The boiler is suspended from wrought-iron girders, which rest upon iron columns that are entirely independent of the brickwork; and hence the brickwork may be repaired, or may even be removed altogether, without disturbing the boiler itself. The fire is situated under the front or higher end of the inclined tubes, and the products of combustion are guided by division plates and bridges so that after rising from the fire grate they pass between the tubes to the combustion chamber under the drum, then downward among the tubes again, and finally upward and to the chimney. This devious course, as well as the staggering of the tubes, is intended to bring the hot gases into intimate contact with the tubes at every point. As the water in the boiler becomes heated, it rises toward the higher end of the tubes, becoming meanwhile partially converted into steam. The column of mixed water and steam ascends into the drum, where its constituents separate, the steam remaining in the drum, while the water flows to the rear, where it passes down through the long, upright tubes, and so completes the circulation.

Water-tube boilers are now used to some extent in marine work, and especially in the naval service. Attention has been particularly directed to this branch of the subject by the recent elaborate investigations of the Commission appointed by the British Admiralty, for the purpose of recommending a standard type of boiler for use in the British navy. (See 'Engineering News,' 4 Sept. 1902, page 176.) The Belleville boiler, which has heretofore been somewhat extensively used in that service, is represented, diagrammatically, on plate. It consists essentially of a series of water-tubes, slightly inclined to the horizontal, and opening at the bottom into malleable iron collector boxes, and at the top into a drum to which the main steam pipe is attached. The feed water is introduced at the middle of the upper drum, and is injected under a pressure in excess of that which is carried upon the boiler itself. To prevent the comparatively cool feed water from entering any of the tubes in which steam is generated, these tubes are caused to project at least eight inches into the drum. The feed passes down through return pipes at the sides of the boiler, and enters the tubes below, after its temperature has been raised by the heat of the furnace sufficiently to prevent injury from contraction strains. The proper regulation of the feed-water supply is one of the difficult practical points about the Belleville boiler; and to overcome it as far as possible an ingenious automatic feed device is provided. As will be understood from an inspection of the engraving, there is little or no true circulation in boilers of this type. The tube-groups discharge a mixture of steam and water into the drum, where the steam is supposed to be freed from the water by the aid of a system of baffle plates that are not shown. An economizer is placed in the stack above the boiler in the most approved modern installations, the construction of the

economizer being similar to that of the boiler itself, except that the tubes composing the elements are smaller. The Commission already referred to reported somewhat unfavorably upon the Belleville boiler, but did not suggest any other special type of water-tube boiler for general use aboard ship. It inclined rather toward cylindrical boilers for ordinary purposes, with auxiliary water-tube boilers for emergencies.

All boilers are supposed to be provided with certain appliances intended to secure safety, and uniformity of working. Noteworthy among these are the safety valve, and the gauges that indicate the pressure of the steam and the position of the water level. These are described under separate headings.

The "horse-power" of a boiler is often spoken of; but the term is a loose one, without any definite significance, because the horse-power that can be realized from a boiler depends to a very great extent upon the engine that is used to develop the power, and upon how hard the boiler is forced. The Centennial Commission adopted, as the definition of a horse-power (when that expression is used in connection with a boiler), the "evaporation of 30 pounds of water per hour, when the temperature of the feed water is 100° F., and the pressure of the steam is 70 pounds per square inch, as read from the gauge."

Steam boilers may explode from any one of a great variety of causes. Of these three are specially worthy of mention: (1) The boiler may be poorly made or poorly designed, so that even when it is new it is not capable of safely withstanding the load that is put upon it. All boilers, however well made, should have a "factor of safety" of five; that is, they should be able to sustain a pressure five times as great as the regular working pressure, before bursting. (2) A boiler, originally good, may be wasted away, either locally or generally, by corrosion or other form of deterioration, or it may develop defects in service, which detract from its original strength sufficiently to lead to explosive failure. Competent periodical inspection will materially lessen the liability to explosion from causes of this sort. (3) The water in the boiler may become low, through neglect or through the failure of the feed-apparatus, so that the metal becomes overheated or burned, and loses its strength. This is the cause almost invariably assigned, by the general public and even by minor "experts," when the boiler explosion occurs, and the attendant is frequently censured for his carelessness when the explosion was really due to some totally different cause. When an explosion is attended by great manifestations of force and energy, it is safe to conclude that a plentiful supply of water was present; for a boiler full of heated water contains vastly more energy than one that is merely filled with steam at the same temperature. (See Thurston, 'Steam Boiler Explosions.') Pound for pound, steam contains more energy than water, when the two are at the same temperature; but cubic foot for cubic foot (and this is the way that the comparison should be made in reasoning about a boiler explosion), the water has an enormous advantage, owing to its greater density.

For further details concerning boilers, consult F. R. Hutton, 'The Mechanical Engineering of Power Plants'; J. G. A. Meyer, 'Modern

BOILING POINT — BOIS DE BOULOGNE

Locomotive Construction'; Peabody and Miller, 'Notes on Steam Boilers'; R. H. Thurston, 'A Manual of Steam Boilers,' and 'Steam Boiler Explosions'; William Kent, 'Steam Boiler Economy'; W. H. Shock, 'Steam Boilers'; Leslie S. Robertson, 'Water Tube Boilers'; and W. H. Ford, 'Boiler Making.' See also the 1899 'Code' for boiler trials, in Vol. 20 of the 'Transactions of the American Society of Mechanical Engineers.'

A. D. RISTEEN,

Hartford Steam Boiler Insp. and Ins. Co.

Boiling Point, the temperature at which a liquid boils, when exposed to a definite pressure, which is understood to be the ordinary atmospheric pressure, in the absence of any specific statement to the contrary. When a liquid is freely exposed to the air, evaporation goes on constantly from its surface, the heat required being absorbed from surrounding bodies. If the liquid is warmed, the evaporation goes on at an increased rate; but as its temperature is increased by the application of heat, there comes a time when mere superficial evaporation cannot take care of all the heat supplied. Bubbles of vapor then form within the body of the liquid, and the liquid is said to have attained its "boiling point." If the supply of heat be now increased, it is found that the temperature of the liquid remains stationary; bubbles merely form more rapidly, so that the rate of loss of heat through evaporation is still maintained equal to the rate of supply. The temperature of boiling depends upon the pressure; for at an increased pressure the bubbles are formed in the interior of the liquid with greater difficulty, and therefore not until a higher temperature is attained. The variation from this cause is considerable. Thus the boiling point of water, under a pressure of one atmosphere, is 212° F., while under a pressure of two atmospheres it is about 250° F. At the reduced pressures prevailing on the tops of mountains, the boiling point of water is lower than 212° F., and advantage of this fact is taken for determining the heights of mountains by observations of the boiling point at their summits. (See **HYPSOMETRY**.) When the liquid is not open freely to the air, but confined in a closed vessel, its temperature can be raised indefinitely by the application of heat, but the vapor in the space above it is denser, and has a greater pressure, at higher temperatures. The correspondence between pressure and temperature, under these circumstances, is very exact, although no simple law connecting the two is known. Rankine gave an empirical formula for the relation between them, of which computers of steam tables have made great use ('Miscellaneous Scientific Papers,' page 1); but the physical significance of this formula is unknown. The relation between the pressure and boiling point of a liquid is commonly exhibited by means of a table in which the temperatures of ebullition are set down opposite the corresponding pressures. (For a table of this sort for water, see **STEAM**.) The phenomena described above in connection with the free evaporation from a liquid exposed to the air are in general true, but certain qualifications must be made, under certain special conditions. Thus, it is difficult to induce water to boil when it has been freed from dissolved air; and in the entire absence of such air De Luc found that water can be heated as high as 234° F., under ordinary

atmospheric pressure, before boiling, if the experiment is performed with proper care. A liquid thus heated to a temperature in excess of the normal boiling point corresponding to the pressure to which it is subjected is said to be "superheated." When boiling does finally occur in a superheated liquid, it takes place with almost explosive suddenness, and the loss of vapor is exceedingly rapid for a moment or two, until the temperature of the liquid has been reduced by this means to the normal temperature corresponding to the pressure prevailing at the time. The temperature at which ebullition takes place is also influenced to a certain extent by the nature of the vessel in which the liquid is heated. Thus Marce found that in a glass vessel which had been carefully washed out with sulphuric acid, and then well rinsed, pure water does not boil until a temperature of 223° F. has been attained. All results of this kind are of an indefinite character, however, since they relate to the temperature at which boiling first begins, rather than to the state in which the liquid and its vapor are in a condition of permanent thermal and mechanical equilibrium. Superheated water is in an unstable state, and, according to some authorities, not a few boiler explosions have been due to the superheating of the water present, from some cause, and the subsequent explosive liberation of steam, as the water returned to its normal condition; but this notion concerning the cause of boiler explosions has never been substantiated by experiment or otherwise, and must be regarded as a mere speculation, without any foundation in fact. A liquid has a higher boiling point, when it contains some substance in solution, than it has when pure. The effect of dissolving salt or any other electrolyte is complicated by the occurrence of dissociation (q.v.); but for dilute solutions of non-electrolytes, like sugar, the following law, first given by Raoult, holds true: If a series of dilute solutions of such substances be prepared, each solution containing, per unit weight of the solvent, an amount of solid proportional to the molecular weight of the solid, then the solutions so prepared will all boil at the same temperature. (See **SOLUTIONS**.) For marking the "boiling point" upon thermometers, it is the universal practice to expose the thermometers to the steam rising from the boiling water, rather than to immerse them in the water itself; for the temperature of the steam is independent of the presence of traces of dissolved substances in the water, and also of the action of such accidental or irregular causes as the superheating of the water. See **THERMOMETRY**.

Boilly, Louis Leopold, loo-e lā-ō-pōld bwā'ye, French painter: b. La Bassée, France; d. 1845. To his prolific brush are attributed about 5,000 paintings, chiefly historical. The period represented on his canvases ranges from the time of Louis XVI. to the end of the Restoration. Among his works are: 'Arrival of the Diligence' (1803); and 'Isabey's Atelier.'

Bois d'Arc, bwā-dārk, the osage orange (q.v.).

Bois de Boulogne, bwā-dē boo-lō-ny, once a forest abounding with game near the gates of Paris, now a beautiful park belonging to the city; area, 2,250 acres. The greater part of the old trees were destroyed during the revolution. When Napoleon chose St. Cloud for a summer

residence, he ordered young trees to be planted, had the place enclosed with a wall, and stocked with game. In 1815 the British troops under the Duke of Wellington were stationed in it, and many of the trees were then cut down, but new ones were planted by Louis XVIII. In 1852 it came into the possession of the municipality, and is now one of the gayest holiday promenades. During the Franco-German war of 1870-1 a large number of the trees were cut down by the French in preparing for the defense of Paris. In the time of the disturbances of the Commune in 1871 several sanguinary encounters took place here. In the Bois are the noted Auteuil and Longchamp race courses, and also the Jardin d'Acclimatation.

Bois-le-Duc, bwā-lē-dük (Dutch HERTOGENBOSCH), the capital of the province of North Brabant, in Holland, 49 miles southeast of Amsterdam, at the confluence of the Dommel and the Aa, which form, by their junction, the Diest. It was a strong fortress up to 1876, but has ceased to be kept as such. It is intersected by canals, and among its buildings the chief is the cathedral, in late Gothic, built in 1458-98, with an old tower of the 11th century, and a chapel of the 13th, the whole recently restored. Other buildings are the town-hall, palace of justice or court-house, the episcopal palace, and the government buildings. Among educational institutions are a gymnasium, a Latin school, and a normal school for teachers. Bois-le-Duc has many industrial establishments and an active trade. Its chief manufactures are gold and silver wares, cigars, mirrors, boots, and shoes, etc. The city suffered much in the religious wars of the 16th century, and fell into the hands of the Dutch in 1629. On 14 Sept. 1794, the French defeated the English here, and on 9 October of the same year it surrendered to Pichegru. In January 1814, it was taken by the Prussians, but the citadel held out. Pop. (1900) 44,034.

Bois-Guilbert, bwā-gel-bār, **Sir Brian**, a character in Scott's 'Ivanhoe.' He is a Knight Templar whose passionate attachment to the beautiful Jewess Rebecca, severe struggle with his pride and tragical death in the lists, form one of the most dramatic features of the romance.

Bois de Vincennes, bwā dē vān-sēn, the ancient hunting park of Louis IX.; now a pleasure-ground of 2,250 acres on the west of Paris. A large portion of it is devoted to the purposes of the Champ de Manœuvres, drill-ground, and polygone d'artillerie.

Boise, James Robinson, American educator: b. Blandford, Mass., 27 Jan. 1815; d. Chicago, 9 Feb. 1895. He was graduated at Brown in 1840, and received an appointment there as tutor in ancient languages. In 1850 he went abroad to study; in 1862 became professor of the Greek language and literature in the University of Michigan; in 1868 took the same chair in the University of Chicago. Upon the establishment of the new University of Chicago, he was appointed professor emeritus of New Testament Greek. The numerous classical text-books edited by him were widely used. Besides these, he published: 'Notes on the Greek Text of Paul's Epistles to the Ephesians, Colossians, Philemon, and the Philippians' (1884); 'Notes on the Greek Text of Galatians and Romans' (1886).

Boise, Otis Bardwell, American composer and music teacher: b. Oberlin, Ohio, 13 Aug. 1844. After studying music in Leipsic he settled in New York as a teacher of composition and for a time was organist of the Fifth Avenue Presbyterian Church. During 1876-7 he was again in Europe studying and had the benefit of Franz Liszt's advice and criticism, after which he resumed teaching in New York. Since 1888 he has been engaged in professional work in Berlin. He has published: 'Harmony Made Practical' (1900); 'Music and Its Masters' (1901), and many articles in journals devoted to music.

Boise, Idaho, the capital of the State and county-seat of Ada County; on the Boise River and the Union P. R.R.; 45 miles southwest of Idaho City. It occupies the site of a former trading post of the Hudson Bay Company; is in an agricultural and a rich mining region; and is supplied with pure hot water from a flowing boiling well. The city is said to be the only one in the world having a natural supply of hot water. It contains the State capitol, erected in 1885-7, penitentiary, United States assay office, State library, high and graded schools, and two national banks. Its mayor is elected biennially. Pop. (1900) 5,957.

Boisgobey, Fortuné Abraham du, fôr-tü-nā āb-rā-ham du bwa-gō-bā, French novelist: b. Granville, 11 Sept. 1821; d. February 1891. In 1844-8 he was paymaster in the army at Algiers, and began to write in 1868, somewhat on the lines of Emile Gaboriau. His novels were popular, and include: 'The Scoundrels' (Paris 1873); 'Chevalier Casse-Con' (1873); 'The Mysteries of Modern Paris' (1876); 'The Demi-Monde Under the Terror' (1877); 'The Old Age of M. Lecoq' (1878); 'The Cat's Eye' (1888); and 'The Cold Hand' (1879).

Boisserée (bwā-srā) **Collection**, a number of pictures exhibited in Munich, which were collected by the brothers Sulpice (1783-1854) and Melchior Boisserée (1786-1851), and John Bertram, men who, animated by love of the arts, began, at the time of the destruction of the monasteries, during and after the French revolution, to purchase old pictures, and afterward completed their collection by the addition of many valuable paintings of the old German school. By this collection the brothers Boisserée and Bertram happily realized the idea of a historical series of old German paintings. It is to their endeavors that we owe the discovery that Germany possessed, as early as the 13th century, a school of painters of much merit, which, like the Italian, proceeded from the old Byzantine school, but became, in the sequel, distinguished by excellences of its own. We owe to these collectors, also, the restoration to favor of the forgotten Low German masters, and a just estimation of John van Eyck, as the creator of the genuine German style of painting. The most distinguished connoisseurs and artists, including Goethe, Canova, Dannecker, and Thorwaldsen, have strongly expressed their admiration of this collection. It was first brought together and exhibited at Heidelberg, and afterward removed to Stuttgart, where the king of Württemberg assigned it a suitable building. The collection remained there till 1828, when King Louis of Bavaria, having purchased it in the previous year for 120,000 thalers, removed

it to Schleissheim, and in 1836 most of the paintings were sent to Munich. A lithographic work on this collection was published in 40 parts between 1821 and 1840. See 'Sulpiz Boisserée,' a biography (1862).

Boissier, Marie Louis Gaston, mā-rē loo-e gās-tōn bwā-syā, French archæologist and historian: b. Nîmes, 15 Aug. 1823. After studying at the Ecole Normale he was an instructor in rhetoric in his native city 1847-57; professor of Latin eloquence and literature at the Collège de France from 1861, was elected to the French Academy in 1876 and to the Academy of Inscriptions and Belles-lettres 1886. His literary style has been much praised for its clearness and beauty. His works comprise 'Le poète Attius' (1857); 'Etude sur la ire et les ouvrages de Terentius Varron' (1861); 'La religion romaine d'Auguste aux Antonins' (1883); 'Lafin du paganisme' (1894); 'Cicéron et ses amis' (1892); and 'Promenades archéologiques Rome et Pompéi' (1892); the two last named being marvelously accurate and vivid reconstructions of the antique spirit and atmosphere. Other works are: 'Roman Africa,' and 'The Country of Horace and Vergil.'

Boissieu, Jean Jacques de, zhōn zhāk bwā-sye, French painter and engraver: b. Lyons, 1738; d. there in 1810. He was intended by his parents for the magistracy, but manifested such a decided inclination for drawing that he was allowed to follow it. After remaining for some time at Lyons, and painting some excellent imitations of the Flemish school, he visited Paris, where his intimacy with the most celebrated artists of the time enabled him greatly to improve his style. On his return to Lyons he devoted his attention chiefly to engraving. He afterward accompanied the Duc de Rochefoucauld to Italy, and having studied the works of the great masters with the greatest assiduity, resumed painting; but as the use of oil injured his health, he, shortly after his return to France, abandoned it finally for engraving, in which his reputation soon became European, and his works were eagerly purchased by the most wealthy and distinguished amateurs. His engravings amount to 140 plates, among which that of 'Le Charlatan,' after a picture by Karel Dujardin, is considered his masterpiece.

Boissonade, Jean François, zhōn frān-swa bwā-sō-nad, French classical scholar: b. Paris, 12 Aug. 1774; d. Passy, 8 Sept. 1857. He was educated at the Collège d'Harcourt, and at the age of 18 was attached to the ministry of foreign affairs. He subsequently became a contributor to periodical literature in the 'Magasin Encyclopédique' of Millin and the 'Journal de l'Empire,' the precursor of the 'Journal des Débats.' Ancient and modern literature, both French and foreign, grammatical criticism, bibliography, and natural sciences occupied his pen. In 1813 he was admitted a member of the Academy of Inscriptions and Belles-Lettres. He afterward wrote about 150 articles for the 'Biographie Universelle.' He became, in 1809, assistant of Larcher, as Greek professor of the faculty of letters in Paris, and four years afterward he succeeded him both in the faculty and in the institute. Finally, in 1828, he was called to the chair of Greek literature in the College of France. From this time he devoted himself entirely to his duties as a professor, and his

labors as a classical editor. He has produced no complete work in French, but is said to have written Latin with natural grace and elegance, and his editions of the classics are highly esteemed. His editorial labors were also extended to a few French works, and he translated a heroï-comic poem, the "Genpillen," from the Portuguese.

Boissy d'Anglas, François Antoine, frānswā ān-twan bwā-se dan-glas (COMTE DE), French statesman of the revolutionary period: b. Saint Jean-la-Chambre, near Annonay, 1756; d. Paris, 20 Oct. 1826. He studied at Annonay, and was admitted as an advocate to the parliament of Paris. In 1789 he was elected to the States-General where he was a moderate advocate of revolutionary principles, in support of which he wrote at this time various brochures. In 1792 he was returned as a deputy to the convention. He voted against the death of Louis XVI., and after the fall of Robespierre he was appointed secretary of the convention, and a member of the Committee of Public Safety. He was created a peer by Louis XVIII. in 1814, but supported Napoleon during the Hundred Days, and was consequently expelled from the peerage by a royal ordinance, but shortly afterward reinstated. He was from 1803 a member of the consistory of the Reformed Church, a member of the Institute from its commencement, and on its reconstruction in 1816 he became a member of the Academy of Inscriptions. He wrote an essay on the life and writings of Malesherbes (1819-21); 'Etudes Littéraires et Poétiques d'un Vieillard' (1825).

The fame of Boissy d'Anglas rests chiefly on a scene in the convention in 1795, when the hall was invaded by an angry mob demanding bread and the Constitution of 1793. Called temporarily to take the chair, in the absence of the president, Boissy had presented to him the head of a deputy, Féraud, which had been cut off by the insurgents and placed on the end of a pike. He saluted it, and continued calmly facing the mob, and to his courage and firmness the safety of the convention at this crisis is attributed. Such is the popular version of a story of which the most various and contradictory accounts are given. It has been said that Boissy d'Anglas exhibited no such courage as has been attributed to him, and that he was merely kept in his place by the pressure of the mob. His enemies, who accused him of reactionary tendencies, even said the insurrection was started by the reactionary party to discredit the revolution, and that Boissy was in understanding with the leaders of the mob. For this last accusation there appears to be no foundation, but it is quite likely the scene may have been represented in a more dramatic form than as it actually occurred.

Boito, Arrigo, ā-rē'gō bō-ē'tō, Italian composer: b. Padua, 24 Feb. 1842. His great work, the opera 'Mefistofele,' occupied him for nearly 20 years. The garden scene was written while he was a student in the Milan Conservatory in 1856, and the score was finished for the stage in 1868, the composer having done much literary work in the interim and lived variously in France, Germany, and Poland. On 5 March 1868, 'Mefistofele' was sung at La Scala, Milan, the performance lasting six hours, much interrupted by hissing and applause, and its failure was evident. Boito then remodeled the opera,

and in 1875 it was produced at Bologna with great success. It was sung in other cities with equal success, but it has never been a popular opera in the full sense of the word. In 1883 it was produced at the New York Metropolitan Opera House with Campanini and Nilsson in the cast and was revived in 1896 and again in 1901. The opera is considered one of the most important of modern Italian operas, marking, as it does, the precise point where the modern school of Italian composition, illustrated by the later works of Verdi, Mascagni, Puccini, etc., diverges from the work of the Bellini and Donizetti school. Boito's other operas, 'Ero e Leandro'; 'Nerone'; and 'Orestiaide' have never been sung.

Boivin, Marie Anne Victoire, mā-re ān vīc-twār bwa-vān (GILLAIN), French midwife, upon whom a diploma of M.D. was conferred by the University of Marburg, noted for her writings on obstetrics: b. Montreuil, 9 April 1773; d. 16 May 1841. She was educated in a nunnery, where by her talents she attracted the attention of the sister of Louis XVI., Madame Elisabeth. When the nunnery where she was placed was destroyed in the course of the revolution, she spent three years in the study of anatomy and midwifery. In 1797 she married an employee at Versailles, of the name of Boivin, but on being left after a short time a widow with a child and without fortune, undertook the office of midwife at the Hospital of the Maternity, and, in 1801, was appointed chief superintendent of the institution, to which, in accordance with her suggestion, a special school of accouchement was added by Chaptal. Her 'Mémorial de l'art des accouchements,' published in 1824, passed through several editions. The empress of Russia invited her to St. Petersburg, but she declined.

Bojaca, bō-zhā'ka, **Battle of**, so called from having been fought near the bridge of the small town of Bojaca, not far from the city of Tunja, between the Spaniards under Barreyro, and the united forces of Venezuela and New Granada, commanded by Bolivar. It occurred 7 Aug. 1819, and was decisive of the independence of New Granada. Among the Republicans, Gens. Anzuategui, Paez, and Santander distinguished themselves; and the Spaniards sustained a total defeat, their general, most of their officers and men who survived the battle, together with all their arms, ammunition, and equipments, falling into the hands of Bolivar. So complete was the destruction of the Spanish army, that the viceroy instantly fled from Santa Fé, leaving even the public treasure a prey to the conquerors.

Bojador, bō-zhā-dōr', **Cape**, a promontory on the west coast of Africa; lat. 26° 7' 10" N.; lon. 14° 29' W. It is one of the projecting points of the great desert of Sahara, and forms the west extremity of a rocky ridge called the Jebel-khal or Black Mountain. The coast north of this cape is extremely dangerous, being shallow to a great distance out, and constantly enveloped in a haze. It has been, in consequence, the scene of many a melancholy disaster. Cape Bojador was long the limit of navigation toward the south and was first passed by the Portuguese in 1433.

Bojol', Philippines, an island north of Mindanao, about 40 miles long by 30 miles wide. It is woody and mountainous. Rice and gold are its chief productions. Pop. 187,000.

Bok, Edward William, American editor: b. Helder, Holland, 9 Oct. 1863. He came to the United States in infancy, and was educated in the public schools of Brooklyn. He has edited the 'Ladies' Home Journal,' and written 'The Young Man in Business,' and 'Successward.'

Boker, George Henry, American poet and dramatist: b. Philadelphia, Pa., 6 Oct. 1823; d. there, 2 Jan. 1890. He graduated from Princeton in 1842; studied law; and was United States minister to Turkey in 1871-5, and to Russia in 1875-9. His plays include: 'Calynos' (1848); 'Anne Boleyn' (1850); 'Francesca da Rimini'; 'The Betrothed'; and 'All the World's a Mask.' He published also 'Poems of the War' (1864); 'Konigsmark and other Poems' (1869); 'The Book of the Dead' (1882); and 'Sonnets' (1886); 'Francesca' is his best play and has been several times put upon the stage by Barrett and other actors.

Bokelmann, Christian Ludwig, krīst-yān lood-vīg bō'kēl-mān, German painter: b. Saint Jurgen, 1844; d. 1894. He was a pupil of Wilhelm Sohn at Dusseldorf and became distinguished as a genre and portrait painter. Among his works are: 'House of Sorrow'; 'Pawnbroker's Shop'; 'Opening of the Will'; 'Portrait of Klaus Groths.'

Bokhara, bō-kā'ra, a khanate of Central Asia, practically vassal to Russia, bounded on the north by Russian Turkestan, west by Khiva and the Russian Trans-Caspian territory, south by Afghanistan, and east by Russian Turkestan. It formerly occupied considerably more territory than now, having been reduced by the conquests and encroachments of Russia, which have been only partially compensated by some additions. The present area of the khanate is estimated at about 92,000 square miles. The country is to a great extent occupied by deserts and low and naked ranges of mountains, and the cultivated portions of it are confined to the valley of the rivers, especially the Oxus or Amoo Daria, which forms the southern boundary for a considerable distance, and then flows from southeast to northwest parallel to and not far from the frontier of the country. Bokhara lies between lat. 37° and 41° N., and in greater part is no more than 1,100 or 1,200 feet above the level of the sea, but in the extreme east is mountainous. The climate is subject to great extremes, being warm in summer and very cold in winter. There is very little rain, on which account it is necessary to resort to artificial irrigation. Besides cereals, cotton, tobacco, and vegetables are cultivated, and there is abundance of fruit. The total population amounts to about 2,250,000, and consists of the Uzbecks, who are the ruling race, and to whom the emir belongs; the Tajiks, who form the majority in the capital; the Kirghizes, less numerous than the Tajiks; about 60,000 Arabians, descendants of the soldiers who were brought into the country by the third caliph of Bagdad on the occasion of the conquest of Turkestan; Persians who have chiefly been brought as slaves to Bokhara; Turcomans, Hindus, and about 10,000 Jews who live in the towns beyond the protection of the law, and accordingly oppressed by the other inhabitants. Since the

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separation of Samarcand there are now only two towns of importance in Bokhara, namely, the chief town Bokhara, with a population of about 60,000; and Karshi, with about 25,000. Besides these there are a few small towns and some hundred villages in the country. The capital, according to Vámbéry, the centre of Tartar civilization, is ill built and has a gloomy aspect, and in luxury of dress and mode of life is far behind the towns of western Asia. Among the people there reigns the utmost moral corruption along with a rigorous adherence to outward forms. The country is distinguished from the other countries of Central Asia by its numerous schools, and in the same proportion by the amount of culture diffused among the people generally; but the women are even more degraded than in other Mohammedan countries. The rule of the emir is absolute, though he is to some extent under the influence of the clergy. The manufactures are unimportant, but there is a very considerable caravan trade, cotton, rice, silk, and indigo being exported, and woven goods, sugar, iron, etc., being imported. There is also now a trade by railway, since the making of the line from the Caspian to Samarcand. Bokhara is remarkable for its religious fanaticism, and various European travelers have been exposed to danger. After Alexander Burnes had visited Bokhara on a commission from the government of India in 1832, the British ambassador in Teheran sent Col. Stoddart in 1838 to obtain from the Emir Nasrulla the deliverance of the Russian prisoners that he had taken on his predatory incursions into Russian territory. Nasrulla, however, irritated at the neglect to answer his letter to the queen of England, ordered Col. Stoddart to be thrown into prison, and after treating him with great cruelty, compelled him to acknowledge the Mohammedan creed. Capt. Conolly, who had been with a similar object in Khiva and Khokand, came in 1841 to Bokhara, and after having to submit to the same treatment as Col. Stoddart, was executed along with him in 1842. Information of their fate was brought to Europe by the missionary Wolff, who had been sent to Bokhara in 1843 for this purpose.

In 1850 the Russians established themselves at the mouth of the Sir (Jaxartes), where it flows into the Sea of Aral, and in 1864 they found it necessary to proceed farther up the river. They made themselves masters of the two towns Turkestan and Aulie-ata, and after bringing them into communication with one another, invested Chemkend, Niazbek, and Chinab. The land thus occupied, which up to that time had formed the northern half of the khanate of Khokand, was, along with some other districts that had previously been annexed to Russia, erected into the Russian government of Turkestan, and incorporated with the general government of Orenburg, by the ukase of 14 Feb. (26) 1865. By a subsequent ukase, dated 11 July (23) 1867, this territory was constituted a general government. Soon after the khan of Khokand invaded the Russian territory, in consequence of which the Russians advanced still farther south and attacked Tashkend, which they took on 28 June 1865. They did not, however, incorporate Tashkend with the Russian territory, but declared it an independent khanate under the protection of Russia. This arrangement was opposed by Muzaffer-

Eddin, Emir of Bokhara, whereupon the Russian general Romanovski again assumed the offensive, and marching into Bokhara took Khojend by storm on 5 June 1866. In this way Russia came into the possession of the whole basin of the Sir. Not long after Tashkend was incorporated with the Russian territory by the desire of the inhabitants. Meanwhile the war with Bokhara still went on, and peace was not concluded till the beginning of 1867. This peace, however, did not last long. The war was renewed in the spring of the following year, and it was only in July 1868 that the terms of peace between Russia and Bokhara were finally agreed upon. Bokhara was to give up Samarcand and Katti Kurghan, along with the surrounding districts (constituting the tract of land watered by the Zerafshan), and at the same time promised to pay an indemnity to Russia and to protect her trade. Since then the peace has not been broken, but the Emir of Bokhara has sunk more and more into a position of entire dependency on Russia. During the autumn the Russians intervened against the emir's son, who had risen in revolt against him, and on 12 October in the following year the emir sent an embassy with presents (tribute) to the czar at St. Petersburg. In the meantime Muzaffer-Eddin had fallen into a dispute with Afghanistan. Shere Ali Khan, of Kabul, had given a favorable reception to the rebellious son of the emir, and Muzaffer-Eddin, probably in consequence of encouragement from Russia, now thought himself able to make good his former claim to Badakshan, and the territory lying about the sources of the Oxus, especially since the Khan of Kabul seemed to have but a slight hold of these parts. He had accordingly already sent out an army with the view of conquering those parts, when, toward the end of 1869, pressure being put upon him by Russia, he concluded a treaty with Kabul by which the Oxus was fixed as the boundary of the conterminous states, and this boundary was afterward recognized by Russia and England. After the Russian expedition to Khiva in 1873 an agreement was made between Russia and Bokhara on 28 September of that year, according to which Bokhara received a portion of the territory that had been ceded by Khiva to Russia, while the Russians received various privileges in return. Muzaffer-Eddin died in 1885, and was succeeded by his son Abd-ul-Ahad. Bokhara will probably be ultimately completely placed under Russian administration, for what little power it had lapsed in 1884 by the practical absorption of the country, resulting from the annexation of Merv. Since 1885 the troops, which were formerly ill trained and badly armed, have been drilled by Russian instructors and armed with rifles. See Le Messurier, 'From London to Bokhara' (1899); O'Donovan, 'The Merv Oasis' (1880); Curzon, 'Russia in Central Asia' (1889).

Bokhara, the capital of the khanate of the same name, in lat. 39° 48' N.; lon. 64° 26' E. It is eight or nine miles in circuit, and is surrounded by a mud-wall. It is poorly built, consisting of extremely narrow streets and paltry houses. The principal edifices are the palace of the khan, crowning a height near the centre of the town and surrounded by a brick wall 70 feet high; and numerous mosques, the largest of which is enameled

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with tiles of azure blue, and has a tower 210 feet high. The trade was formerly large with India, but has now been almost completely absorbed by Russia. There are several manufacturing establishments producing blades, various metal articles, silks, and cloth. The pop. (estimated) 60,000.

Bol, bōl, **Ferdinand**, Dutch painter: b. Dordrecht, 1610; d. Amsterdam, 1681. He was the pupil of Rembrandt, and is best known by his admirable portraits, in the style of that master, though he likewise executed several historical paintings of merit. Many of his works are still to be seen at Amsterdam. He also practised etching with success. His best known portrait is that of Saskia, the wife of Rembrandt, now in the Brussels Museum.

Bolan (bō-lān') **Pass**, a celebrated defile in the Hala Mountains, leading from Sind into Beluchistan. It is about 60 miles long, hemmed in on all sides by lofty precipices, and in parts so narrow that a regiment could defend it against an army. It is traversed by the Bolan River. The crest of the pass is 5,800 feet high. The English government has recently built a railway through the pass to connect Sind with Kandahar.

Bolas (that is, "balls"), a form of missile used by the Paraguay Indians, the Patagonians, and especially by the Gauchos of Argentine. It consists of a rope or line having at either end a stone, ball of metal, or lump of hardened clay. When used it is swung round the head by one end, and then hurled at an animal so as to entangle it.

Bolbec, bōl-bĕk, a town in France, department of Seine-Inferieure, 17 miles east-northeast of Havre; agreeably situated on the side of a hill, washed by the Bolbec, which supplies waterpower for its mills, and at the junction of four valleys. It is a thriving and industrious place, and well situated for commerce. Its printed cottons and handkerchiefs have long been held in high estimation. Besides these it produces linen and woolen stuffs, lace, cotton, velvet, and thread, and has several dyeworks and tanneries, with a considerable trade in grain, horses, and cattle. Pop. (1896) 12,239.

Boldini (bōl-de'ne) **Giovanni**, Italian artist: b. Ferrara, 1845. He studied for some time in London, and many of his paintings are found in American collections. His portraits have been especially commended. Among his works are 'Gossips'; 'The Connoisseur'; 'Kitchen Garden'; and 'Portrait of Menzel.'

Boldrewood, Rolf. See BROUNE, THOMAS ALEXANDER.

Bole, an earthy mineral occurring in amorphous masses, and composed chiefly of silica with about 20 per cent of alumina and 10 of iron. It is of a dull yellow, brownish, or red color, feels greasy to the touch, and yields to the nail. It has a conchoidal fracture; its streak is shining, and it is opaque or slightly translucent. It is found in various localities, such as Armenia, Saxony, Tuscany, and the isle of Skye in Scotland. In ancient times, under the name of Lemnian bole or earth, it had a place in the materia medica, but is no longer used. At present

the only bole of commerce is a coarse pigment sold under the name of Berlin and English red.

Bolero, bō-lā'rō, the name given by the Spaniards to a number of their national dances of the ballet class, which in Spain are regularly performed in theatres between the different pieces. They are danced both by men and women, the male dancers who take part in these performances being also called boleros, while the females are called boleras. The dances of this class which are best known and most in vogue are known by such names as the Cachuca, Iota aragonesa, Madrileña, Ole, Ialeo de Jerez, etc. They are danced by one or more couples, or, as in the case of the indecent Ole, by a single female dancer. The dancers wear the Andalusian costume, partly because of all the national dresses of Spain this is the richest and most elegant, and partly because the greater number of the boleros are of Andalusian origin. The music for these dances is always played by the orchestra, and is generally marked by rapid changes of time. The melodies are often very beautiful, and are always based upon some of the national airs. The dancers mostly beat time to the music with the castanets (castañuelas). These dances, when the performers are well trained and handsome, have a very powerful effect on the spectators, consisting as they do of graceful attitudes and movements of the body, and being strictly speaking not dances, but pantomimes. The dancers endeavor to express by their gestures all the different phases of the passion of love, and this often in a manner which passes far beyond the bounds of modesty. The dances of the common people, on which the boleros are founded, are essentially distinguished from the latter by the fact that the former are accompanied by singing,—partly that of the performers, partly that of the spectators,—while the music is mostly supplied by the guitar, or in some cases by the tambourine. They are very simple, but at the same time very graceful. The dancers beat time with the castanets, as in the boleros properly so called.

Boleslas, the name of six kings of Poland and three of Bohemia. The most celebrated of them, Boleslas, surnamed the Great, and the first Polish sovereign who had the title of king, was son of Duke Mietchislaf, and succeeded him in 999. He completed the work of introducing Christianity which his father had begun, contributed greatly to the progress of civilization, and brought the army under regular discipline. The Emperor Otho III. resolved to ascertain his real character by visiting him in person, and was so much pleased with the deference with which he was received, that he crowned him with his own hands in 1001, and exempted him from all homage and tribute. Boleslas assumed all the splendor of his new dignity, and became a powerful sovereign. He not only repelled an aggression on his territories by the Duke of Bohemia, but became in his turn the aggressor, and conquered Moravia. Success awakened a desire for new conquests, and the Russians, who hitherto had always been the aggressors, were attacked in their turn, and were obliged to purchase peace by the cession of large tracts of territory. He afterward turned his arms to the north of Germany, and compelled the greater part of the northern sovereigns to

become his tributaries. In 1012 a formidable league was formed against him by the emperor of Germany and the dukes of Bohemia and Austria; but the allies were glad to conclude a peace with him in 1018. His last campaign was against the Russians, whom he signally defeated in a great battle on the banks of the Bug. After 20 years of continued warfare he was permitted to enjoy peace, and effected numerous internal improvements, promulgating excellent laws, and even putting a check upon his own power by the appointment of a council of 12 to act as mediators between the sovereign and the people. This body was the germ of the Polish senate. Boleslas died in 1025, after a reign of 26 years, which is one of the most glorious in the annals of Poland, and has handed down his name as one of the greatest sovereigns of his time.

Boletus, a genus of fungi of the order *Hymenomycetes* (fungi provided with a cap and a fructiferous membrane or hymenium which covers the sporules contained in the tubes). The greater number of the species are globulous, from which the Italians called them *ovoli*. The characters of the genus are, broad, hemispherical cap, the lower surface formed of open tubes, cylindrical in form, and adhering to one another. The tubes can be separated from the cap, and contain little cylindrical capsules, which are the organs of reproduction. They differ from the *Polyporci* by the absence of the membrane which encloses the tubes. *Boletus edulis* has the pedicle thick, especially at the base, and marked with red and pale white. The cap is also thick, smooth, and fawn-colored. The tubes are very small, rounded, and pass from white to a greenish yellow. It grows on the ground abundantly in woods during summer. The flesh is firm, and has an agreeable nutty flavor. It is a considerable article of commerce in France, particularly around Bordeaux. It is also found in England, but more rarely. The other species of *Boletus* are numerous.

Boleyn, bül'ën, **Anne**, queen of England, one of the wives of Henry VIII.: b. probably in 1500; d. 26 May 1536. The name is also spelled Bullen and Bouleyne. Her father, Sir Thomas Boleyn, had been several times sent by Henry as ambassador to France, and her mother was a daughter of the Duke of Norfolk. At the age of 15 years Anne accompanied to France as maid of honor the Princess Mary of England, betrothed to Louis XII.: but when that princess three years later returned to England a widow, Anne did not follow her, but remained at the French court, the freedom and gaiety of which suited her natural disposition, and where she was admired for her beauty and wit. She was attached to the household of Claudia, wife of Francis I., after whose death she was for a time in the service of the Duchess of Alençon, sister of Francis I. Young, beautiful, gay, and witty, she was an object of great attraction in the gallant court of Francis I. She returned to England about 1522, and became lady of honor to Queen Catharine, whom she soon supplanted. The king, passionately enamored of her, found an unexpected opposition to his wishes, and Anne firmly declared that she could be had on no terms but those of marriage. She knew that the king already meditated a divorce from his wife, Catharine of

Aragon; but she also knew what difficulties the Catholic religion opposed to the execution of this plan. Cranmer offered his services to bring about the accomplishment of the king's wishes, and thus gave the first occasion to the separation of England from the Roman Church. But the impetuous Henry did not wait for the ministers of his new religion to confirm his divorce; on the contrary, he married Anne in January 1533, having previously created her Marchioness of Pembroke. When her pregnancy revealed the secret, Cranmer declared the first marriage void, and the second valid, and Anne was crowned queen at Westminster with unparalleled splendor. In 1533 she became the mother of the famous Elizabeth. She could not, however, retain the affections of the king, as inconstant as he was tyrannical; and as she had supplanted her queen while lady of honor to Catharine, she was now supplanted herself by Jane Seymour, her own lady of honor. Suspicions of infidelity were alleged, which appear to have had no foundation in truth, but were doubtless eagerly laid hold of by Henry as a color for his violent proceedings. In 1535 she was accused, and brought before a jury of peers. Smeaton, a musician, who was arrested with others, asserted that he had enjoyed the queen's favors, and 17 May 1536 she was condemned to death by 26 judges. Anne in vain affirmed that she had long before been contracted to the Duke of Northumberland, and therefore had never been the lawful wife of Henry. Cranmer in vain declared the marriage void. The sentence of death was executed by the command of the inflexible Henry, who esteemed it a great exercise of clemency to substitute the scaffold for the stake. The last day of the life of this unhappy woman, 19 May 1536, presents many interesting moments. She sent for the wife of the lieutenant of the Tower, threw herself upon her knees before her and said, "Go to the Princess Mary (daughter of Catharine) in my name, and in this position beg her forgiveness for all the sufferings I have drawn upon her and her mother." "She sent her last message to the king," says Hume, "and acknowledged the obligations which she owed him in uniformly continuing his endeavors for her advancement." "From a private gentlewoman you have made me first a marchioness, then a queen, and as you can raise me no higher in this world, you are now sending me to be a saint in heaven."

See Strickland, 'Queens of England' (Vol. II., 1875-80); Dixon, 'Two Queens' (1873-4); Friedmann, 'Anne Boleyn' (1885).

Bolgrad, Russia, a town on the river Yalpooh, in the Lower Budjak, colonial district of Bessarabia, 162 miles from Odessa and 30 miles from Ismail. It is celebrated for the frequent mention made of it in the discussions relative to the territorial difficulties of Russia with Turkey in the Treaty of Paris of 1856. Pop. (1897) about 13,000.

Bolingbroke, Henry St. John (VISCOUNT), English statesman, wit, and man of letters: b. Battersea, London, 1 Oct. 1678; d. 12 Dec. 1751. His early education was managed by his mother on strict puritanical principles, against the rigidity of which he appears soon to have rebelled. After attending school at Eton he proceeded to Christ Church College, Oxford, where he soon distinguished himself by the brilliancy of his

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parts rather than by his diligence and application. On leaving the university he is supposed to have spent some years in travel upon the Continent, although he has left no record of this period. He attracted attention by his elegance of manners, with beauty of person, dignity, and affability, and such fascinating eloquence that, according to the unanimous testimony of his contemporaries, nobody could resist him. Unfortunately the passions of his youth opposed the development of his talents; and in his 23d year he was distinguished principally as an accomplished libertine. He married a wealthy heiress, the daughter of Sir Henry Winchcomb, a lady of cultivated mind and noble birth. But the young couple had lived but a short time together when irreconcilable disputes arose between them, in consequence of which they separated forever. By the influence of his father he obtained a seat in the House of Commons. Here his eloquence, his acuteness, and the strength of his judgment attracted universal attention. His former idleness was changed at once into the most incessant activity. In 1704 he was made secretary of war, and came into immediate connection with the Duke of Marlborough, whose talents he discerned and whose enterprises he supported with all his influence. When, however, the Whigs gained the ascendancy in 1708, Bolingbroke gave in his resignation. Now followed the two most active years of his life, in which he devoted himself to study, but by no means neglected public affairs. He continued to maintain a constant intercourse with the queen, who preferred him to her other counselors. The Whig ministry was overthrown, to the astonishment of all Europe, in 1710, and Bolingbroke assumed the department of foreign affairs. In 1712 he was called to the House of Lords by the title of Viscount Bolingbroke, and in 1713, against much popular opposition, he concluded the Peace of Utrecht, of which he was always proud. In concluding this peace everything was unfavorable to him — the Whigs, the peers, the Bank, the East India Company, Marlborough, Eugene, the emperor, Holland, the jealousy of all the European powers, the weakness of his own queen, the irresolution, imprudence, and even the envy of his colleagues. Bolingbroke afterward became a prey to the impetuosity of his passions, and exhibited a fickleness of conduct that has rendered his loyalty, his patriotism, and his whole character suspected. The collision of the Whigs and Tories produced such a general excitement that the ministers were attacked, the Peace was decreed as disastrous, and the Protestant succession was declared in danger. At this moment a fatal contention broke out between the lord-high-treasurer (the Earl of Oxford) and Bolingbroke, immediately after the conclusion of the Peace. Swift, the friend of both, but particularly intimate with the lord-high-treasurer, accused Bolingbroke of having principally contributed to the ruin of their party. Be this as it may, Queen Anne, provoked to the utmost by Oxford, dismissed him four days before her death, and made Bolingbroke prime minister. But the death of Anne changed the whole scene. George I. of Hanover ascended the throne, and the Whigs triumphed more completely than ever. Bolingbroke, who could not impose on the Hanoverian court by his plausible pretenses, and who was as much envied as he was hated,

was dismissed by King George while yet in Germany, and fled to France in March 1715. In August of the same year he was attainted. James III., the Pretender, as he was called, invited him to Lorraine and made him his secretary of state. But when Louis XIV. died Bolingbroke lost all hope of the success of the Pretender, and repented of having entered into so close a connection with him. Whatever the feelings and plans of Bolingbroke may have been, his intentions with regard to James III. were doubtless honest. Nevertheless the latter deprived him of his dignity and transferred it to the Duke of Ormond. Thus it was the strange fate of Bolingbroke to be charged with treachery both by the king and the Pretender. Offers were made to him by King George, on condition of his revealing the secrets of the Pretender. This proposal he at first declined, but he afterward yielded so far as to promise a decisive blow against the cause of the Pretender on condition of the total oblivion of what had already passed, and of an entire confidence for the future. Walpole, however, was afraid of Bolingbroke's influence in Parliament, and opposed his recall. Bolingbroke in order to forget his situation, applied himself to writing philosophical consolations after the manner of Seneca, but soon found sweeter ones in his marriage with a rich and amiable lady, niece of Madame de Maintenon. In 1723 the Parliament which had been so hostile to Bolingbroke was at length dissolved, and he was permitted to return to England. His estates, however, were not restored until two years after by a particular act of Parliament. On his return he lived at first retired in the country, maintaining, however, a correspondence with Swift and Pope. But no sooner was the voice of opposition heard in Parliament than he hastened to London, and, as the restoration of his seat in the House of Lords was still denied him, attacked the ministry during eight years in the journals or in pamphlets with great success. He made for himself powerful enemies, against whom he directed his 'Treatise on Parties,' which is considered his masterpiece. He then returned to France with the intention, as even Swift supposed, of throwing himself into the arms of the Pretender's party, against which charge Pope defended him, and declared that he had himself advised his noble friend to leave an ungrateful country, by which he was suspected and persecuted. In France, Bolingbroke wrote (1735) his 'Letters on the Study and Use of History,' which are admired even at the present day, but in which the individual character of the author appears to the exclusion of general views, and which were blamed, in particular, for attacking revealed religion, which he had once warmly defended. In 1729 in the midst of his contest with Walpole, he had suggested to Pope his 'Essay on Man,' and supplied him with the most important materials. He wrote (1738) his 'Idea of a Patriot King' under the eyes of the heir-apparent. From 1746 he lived in Battersea, where he died.

Bolivar. *Simon, sē-mōn' bō-lē-vār*, South American liberator: b. Caracas, 24 July 1783; d. San Pedro, Alejandro, near Santa Marta, 10 Dec. 1830. He was a descendant of a prominent and wealthy Venezuelan family, studied in Spain, visited Paris, and, when but 18 years old, married in Madrid. His wife died

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soon afterward. The sources of the inspiration of his life's work were: (1) The spectacle of the French Revolution; (2) the example of the United States, which country he visited in 1809; (3) the personality of Gen. Miranda, the leader of the revolutionary movement in Venezuela, who had openly and vigorously attacked Spain's colonial government. Bolivar offered his services to the revolutionary junta a year before Venezuela declared its independence, which was on 5 July 1811.

The revolutionists being at first overwhelmed by the Spanish forces, Bolivar fled to Curaçao. In September 1812 he was at Cartagena; next, we see him scoring against the Spaniards in New Granada; then marching back into Venezuela with only 500 men, but winning so many recruits among the inhabitants that he could meet and defeat Gen. Monteverde at Lastoguanes. He entered Caracas in triumph, 4 Aug. 1813, but suffered defeat in July 1814, and Caracas was again a Spanish town. He then went back to New Granada, succeeding at Bogotá; failing at Santa Marta; resigning his commission, and sailing for Kingston, Jamaica, in May 1814. Next, from Aux Cayes, Haiti, he set out with a little force that President Petion equipped; but this expedition, landing in Venezuela in May 1816 was a failure. Again reinforced at Aux Cayes, he landed (December 1816) in Margarita, and (16 Feb. 1817) at Barcelona, for a three days' battle with Gen. Morillo. The latter was defeated. Bolivar was made commander-in-chief, with headquarters at Angostura. Offering to resign his command to a migratory Congress (15 Feb. 1819), he was urged to continue the war; reorganized the army; crossed the Cordilleras; joined forces with Santander, republican leader in New Granada; caught the Spaniards unawares; entered Tunja July 1819, and on 7 August won the battle of Boyacá. On 17 Dec. 1819 Venezuela and New Granada were merged in the new Republic of Colombia, which included both and absorbed Ecuador after the victory in Bomboná—the union continuing until the close of 1830. Spain made another effort, sending Gen. Torre to take command of her forces; but Torre was defeated on the field of Carabobo, in the central part of Venezuela, 25 June 1821. The constitution of Colombia was adopted, 30 Aug. 1821, and its government inaugurated with Bolivar as president and Gen. Francisco de Paula Santander as vice-president.

But in that great region lying south of Colombia and north of Chile and Argentina Spain was still strong. At the request of the Congress of Peru, Bolivar sent reinforcements under the command of Gen. Antonio José de Sucre, and went in person to the scene of action. Quito was occupied in June 1822; next, the Liberator assumed the presidency at Lima; on 6 Aug. 1824 he triumphed at Junin. Before the end of that year Sucre gave the *coup de grace* to Spain's colonial system on the mainland (though at widely separated points hopeless resistance was offered a little longer), by capturing Viceroy Laserna, General-in-Chief Aymeric, and other Spanish commanders and officers (see AYACUCHO). In June 1825 Bolivar visited Upper Peru, a region of vast extent, which, in his honor, received the name Bolivia (q.v.) when it was organized as a separate republic. In December 1826, returning to Vene-

zuela (where Gen. José Antonio Paez and Admiral José Padilla had destroyed the remnants of Spanish power on the northern coast), he was re-elected to the presidency, though manifesting great reluctance to retain an office the powers of which were wholly inadequate to the task of holding together in a permanent union three states such as Venezuela, New Granada, and Ecuador. Then two important steps were taken: (1) Leaders of the people assured him that he alone could avert disaster and disruption; (2) he himself assumed and attempted to exercise such powers as, in his opinion, were necessary to control the situation. At the height of his fame and strength (for he was in his 47th year), on the eve, however, of a great failure,—for the tendency to disunion in the country freed and consolidated by him had grown beyond control,—Bolivar resigned his command and died.

Bolivar, Colombia, a northern department of that republic, bordering the Caribbean Sea; area 21,345 square miles. The surface of the country is low and heavily wooded, agriculture having made but little progress. The most important rivers are the Magdalena, the Cauca (a tributary of the former), and the Sinu. Capital, Cartagena. Pop. about 300,000.

Bolivia, bō-lēv'yā, an inland republic of South America, bounded on the north and east by Brazil, northwest by Peru, southwest by Chile, south by Argentina and Paraguay. It extends from north to south between lat. 8° and 22° 50' S. and from east to west between lon. 58° and 73° 20' W. Its area is commonly estimated at 567,430 square miles, and its population at 2,400,000.

The principal centres of population are now, and apparently have always been, located in the mountainous region of the western half of the country, called the Sierra. The eastern districts, stretching away from the slopes of the Cordillera far into the torrid interior of the continent, where are the sources of the Amazon's great tributary, the Madeira River, as well as of the Paraguay, a part of the system of the Rio de la Plata, are covered with tropical forests, are but sparsely settled, and by way of distinction are given the name Montaña. The climate of the Sierra, cold in its higher ranges, is mild or semi-tropical on its table-lands and in the deep valleys. Running southeast through the departments of La Paz, Cochabamba, and Potosi is the principal range of the Andes Mountains, called the Cordillera Real. Here are the rich mineral districts of Bolivia: the Cerro Rico de Potosi alone has produced up to the present time about \$2,000,000,000 worth of silver. Here are some of the highest mountains of America and one of the greatest continuous snow-ranges in the world, having an average altitude of 20,000 feet, with the superb peaks of Illimani, Huaina-Potosi, and Illampu lifted 5,000 or 6,000 feet still higher above their gigantic associates. The western range of the Andes continues in a line parallel with the Pacific coast, rejoining the Cordillera Real near Bolivia's southern boundary. Between these two ranges are the high plains, 12,000 to 13,000 feet, and Lake Titicaca, 12,488 feet, above the sea-level. This great sheet of water, 120 miles long, and from 30 to 50 miles wide, has an average depth of 100 fathoms. Lying southeast

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of Lake Titicaca are the two most famous cities of the republic, La Paz and Sucre. A railway from Mollendo on the Peruvian coast climbs up to the plateau, but where it passes over the western range of the Andes the track is 14,765 feet above the sea. On the Pacific side, then, the problem of transportation is very difficult; moreover, as is shown below, the republic has been deprived of the little strip of seacoast that was formerly in its possession.

Turning now toward the east, we find some of the best farming lands in the world, but here also the means of transportation are inadequate, and the products must be carried a great distance before reaching the Atlantic Ocean. The agricultural methods are incredibly primitive. Indian communities or wealthy townspeople own the farms; the Indians plow the land in a fashion that has been thus described:

Oxen are yoked by lashing a light crosspiece of wood immediately behind the horns. To this rude yoke is fastened the long beam of the wooden plow, which is almost exactly like those used by the people of Egypt thousands of years ago. It has but a single handle, and a flat piece of iron is fastened with rawhide at the point of the crooked stick. This cuts the soil to a depth of about six inches. Clods are broken by hand, and the ground is further prepared by dragging a heavy tree over it until the soil becomes smooth.

The roads are but narrow trails winding along the mountain sides, and are for the use of pack animals exclusively. Mules and llamas, driven by Indians, carry loads of coffee, cacao, cinchona bark, wool, and the precious metals.

Natural Wealth and Commerce.—The natural wealth of Bolivia may be shown by an enumeration of the products of its chief geographical divisions, called departments. The department of Potosí is exceedingly rich in silver, tin, and bismuth. Gold also is found in Chilco de Chichas; red and white copper in Lipéz; nitrate in San Cristóbal de Lipéz, and topazes, emeralds, opals, jasper, and marble in Lipéz. The department of Tarija has an abundance of copper, silver, gold, asphalt, marble, etc. Sucre contains silver, tin, coal, lead, copper, gold, and mineral asphaltum. Cochabamba has gold mines that were famous during the time of the Spanish dominion; also silver and marble. Santa Cruz contains rich gold mines that are worked by the natives only; also large deposits of iron ore. La Paz contains famous mines, such as Tipuani and Yani (gold), and Chuquigüillo (silver). Copper, bismuth, tin, marble, antimony, and coal are also found. Oruro contains silver, tin, gold, copper, iron, lead, bismuth, antimony, sulphur, feldspar, borax, topaz, and amethysts.

Though ranking high (fifth in the world's silver-producing countries) in the production of silver, Bolivia is essentially an agricultural and grazing country. The province of Lipéz has great herds of alpacas, vicuñas, sheep, and llamas. Alfalfa and barley grow in Chichas; sugarcane, coffee, wool, potatoes, cereals, flour, and fruits are produced in Charcas (Potosí). In the valley of the Paraguay River, department of Tarija, cacao, wines, maize, barley, and vegetables are the chief products. Cattle and horses abound upon the pasture-lands of the province of Azero. Rice, dairy products, and all varieties of fruits, European as well as tropical, are mentioned among the possibilities or actual achievements in the comparatively small portion of these eastern districts as yet brought under

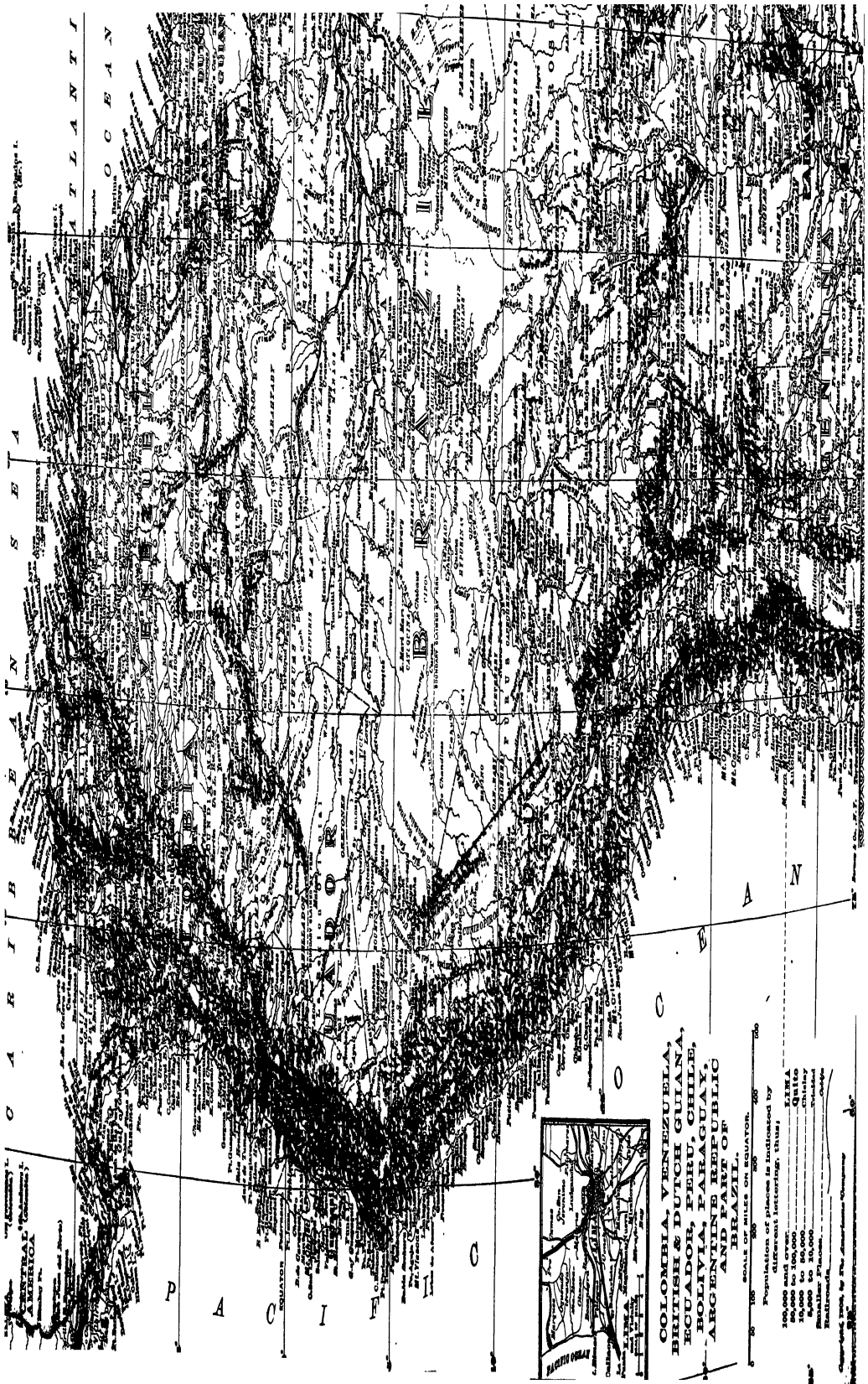
cultivation. Immense areas are covered with rubber-trees, and valuable cabinet- and dye-woods, cedar, mahogany, etc., are among the unexploited treasures of the forests. The exports of rubber from the territory of Acre (to which Brazil also lays claim) were 4,471,374 pounds in 1901. Geographically, a large part of northeastern Bolivia belongs to the Amazon River system, the natural outlet for its products being the waterways of Brazil; and until this opening to the commerce of the world is secured it will remain buried alive.

The exports of the entire nation in 1901 amounted to \$13,621,237.56. The value of imports in the same year was \$6,120,113; of which amount Germany supplied merchandise of the value of \$1,170,755; England, \$827,358; France, \$690,331; United States, \$602,906; Chile, \$600,670; Peru, \$557,107; Belgium, \$471,451; Italy, \$245,252; Argentine Republic, \$218,334; Spain, \$131,570.

Government Receipts and Expenditures.—The budget for 1903 is even more surprising, when we consider the size and natural resources of Bolivia. The estimated receipts of the government to 1903 amount to only \$2,904,807.17; the expenditures for the same period, \$3,385,395.64; the deficit in the budget being \$480,588.47.

Population.—The population is classified as, (1) whites, (2) Quichuas, (3) Aymaras, (4) Chunchos. The first class is composed chiefly of descendants of the Spaniards. The second class is numerically the strongest in the republic, the Quichua Indians being commonly employed either as domestic servants or as laborers in the mines. In the third class are Indians of a distinct tribe, who are found in the department of La Paz and the high plains of the western portion of Bolivia, especially in the neighborhood of Lake Titicaca, where they are employed in pastoral and agricultural pursuits. As for the members of the fourth class, they are aborigines whose scattered tribes,—now inhabiting the eastern departments of Chuquisaca, Beni, and Santa Cruz, with a few representatives also in La Paz and the central department of Cochabamba,—have not even the bond of a common language. There are not sufficient data on which to base an opinion as to their tribal relationships, nor has it ever been possible to make a close estimate of their numbers. It is probable, however, that they are fragments of the original population of this land, displaced by successive waves of invasion, the Aymaras having been the next tribe to gain possession of the great upland plateau. The Quichuas came in at a much later date, when the empire of the Incas was extended from Cuzco, Peru, through all this region (see *History*). While Spanish is the language of the ruling element, both Quichua and Aymara are also in common use, even among the whites.

The professions, and the best positions in the army, the public service, and mercantile business, are monopolized by persons of European descent. Below them are the Mestizos (persons of blended Indian and European blood), more commonly known as "Cholos"—the tradesmen, soldiers, small shopkeepers, etc., constituting a middle class. Lowest in the social scale are the Indian farmers, day laborers, miners, and servants. The lines between



COLOMBIA, VENEZUELA,
GUAYANA FRANCESA, GUAYANA,
ECUADOR, PERU, CHILE,
BOLIVIA, PARAGUAY,
ARGENTINE REPUBLIC
AND PART OF
BRAZIL.

Scale of miles on EQUATOR.

Population of places is indicated by
different lettering, thus:

100,000 and over

50,000 to 100,000

10,000 to 50,000

5,000 to 10,000

1,000 to 5,000

500 to 1,000

100 to 500

50 to 100

10 to 50

5 to 10

1 to 5

Under 1

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these classes being strongly drawn, the structure of Bolivian society has proved to be one of the chief obstacles to the full acceptance of free political institutions.

History.—The country was formed in 1825 from the province of Upper Peru, and named in honor of the South American Liberator, Simon Bolivar. Partly within Peruvian and partly within Bolivian territory are the waters of Lake Titicaca, on the shores of which we find monuments of a civilization antedating the Inca conquest by about 600 years. From the earliest times, therefore, Peru and Bolivia must have been united. The Incas of Cuzco overran this district in the 14th century, and 200 years afterward Hernando Pizarro added it to the conquest his brother had made at the heart of the Inca empire. Under the Spaniards, then, it was known as the district or territory of the high court of Charcas, and remained subject to the viceroy of Peru until 1776, when it became a province of the new viceroyalty of Buenos Ayres. Before the coming of Pizarro the Sierra supplied a large part of the gold used for the decoration of the temples and palaces of the Incas; after the Spanish conquest the natives were driven to work, to continue or increase the output of precious metals for the benefit of masters whose ruthless severity was conspicuous even in that age. There is no entirely trustworthy record of the numbers of those who perished in the mines, but we know that a large Indian population was reduced to its present proportions in the course of two centuries. Taxation was oppressive; provincial governors became monopolists, from whom the natives were obliged to purchase their supplies; here, as elsewhere in America, colonists were forbidden to raise any crops or manufacture any articles which could interfere with the industries of the mother country. Commerce was so strictly limited to Spain that even neighboring colonies were forbidden to have commercial dealings with one another. Toward the end of the 18th century the resentment of the Indians was expressed in several insurrections (1780-82); early in the 19th the provinces of Rio de la Plata and Peru aided the Bolivians in their struggle for independence (July 1809 to August 1825). Gen. Santa Cruz was in command of the expeditions from Lima which failed to drive out the Spanish troops in 1823. But in the following year Gen. Sucre, marching from the same country at the head of an army encouraged by the victory of Ayacucho, was favored by a rising of patriots in all the principal towns. By February 1825 La Paz was in the power of the revolutionists, and in March the Spaniards lost their only remaining stronghold, the province of Potosi.

Deputies from the various provinces assembled at the capital to decide whether the relation of dependence upon Argentina should continue or not. In August they reached the conclusion that they would undertake their own government, and before the dissolution of this Assembly (6 Oct. 1825) independence was declared. The Constitution adopted then (subsequently modified in important respects) was prepared by Gen. Bolivar, and in accordance with the views entertained by the great Liberator at this period in his career, when he was master of Colombia and Peru as well, it vested the supreme authority in a president chosen for life.

The first incumbent was Gen. Sucre, who accepted the presidency for the space of two years only, and took the further precaution to retain 2,000 Colombian soldiers for his protection. In 1827 he and his Colombians were actually expelled from the country.

Since 1827 Bolivia has had seventeen presidents or dictators, the average duration of their terms being about four years. In 1828 Santa Cruz came into power and was confronted with a revolution the following year. In 1835, interposing in a quarrel of political factions in Peru, he defeated Gamarra, and named himself Protector of that country. Chile refusing to consent to the proposed union of her neighbors, three years of fighting ensued. Santa Cruz was defeated and exiled in 1839, but his party in Bolivia kept up the agitation and finally conferred the presidency upon Gen. Ballivian. Meanwhile Gamarra, who had become President of Peru, tried to annex the department of La Paz. He lost his life in this attempt, and then the Bolivians in their turn would have invaded Peru if Chile had not again intervened. Ballivian surrendered his thankless task in 1848. The next President, Belzu, was borne into office on the crest of a wave of revolution; by a revolutionary storm his successor, Cordova, was driven from office and from the land. Linares made himself Dictator in 1858, and was deposed in 1861. President Acha, his successor, fell from power when his forces were defeated in battle by his political antagonist, Melgarejo (February 1865). The latter may be characterized as a revolutionist until 1865; President from that time until 1869; Dictator from 1869 to 1871. Morales, elected in the year last mentioned, was succeeded in 1873 by Ballivian, who died before a twelvemonth had passed. Frias, next to take office, was deposed two years later by the troops, who proclaimed Gen. Daza President.

In 1878 Bolivia and Peru were at war with Chile, and the defeat of the allies after 18 months of hopeless struggling against a well-prepared enemy stripped from the weakest of the contestants her only possessions on the Pacific. Bolivia became a landlocked country. The national anger vented itself first upon the President whom the army had lifted up, and who now fled to escape assassination. But Campero, whom Congress chose to carry on the war, and who personally led the Bolivian troops in the field, was wholly unable to oppose Chile's demands alone, and Peru was an ally without power to aid. Bolivia saw herself obliged to acquiesce in an arrangement which some of her leaders have not yet ceased to regard as provisional and temporary. Her bit of coast line and most of the coveted nitrate of soda deposits in the districts of Cobija and Tarapaca,—territory aggregating 70,181 square miles, with about 6,000 inhabitants,—passed into Chile's keeping. (For an account of the war on the Pacific, see CHILE; PERU.)

Coincidentally, the failure in 1879-80, after years of effort, to secure the opening of a commercial outlet for Bolivian products to the Atlantic through the Amazon River and its great tributary, the Madeira, was a severe blow. The American contractors for the Madeira and Mamoré Railway of Bolivia and Brazil were deprived of the funds necessary to the prosecution of the enterprise by the withdrawal of the loan that had been placed in England in 1872 for the

purpose of constructing this much-needed road. The decision to abandon the undertaking was reached after years of litigation, the final appeal being heard in the British House of Lords.

The Constitution of 28 Oct. 1880 vested the legislative power in a Senate and House of Representatives, and the executive power in a President elected for four years by direct universal suffrage. But little or no improvement in the political situation was observed. President Campero was succeeded by Gregorio Pacheco, and then came Aniceto Arce (1 Aug. 1888). It was necessary to declare a state of siege in all parts of the republic in the summer of 1890. Attempts were made to overthrow the government, and a number of political leaders were arrested. The election of a successor to President Arce took place 3 May 1892. Violent collisions between the rival factions again compelled the authorities to proclaim a state of siege—which was continued even after the inauguration of the new President, Baptista, on 6 August. Indian revolts also occurred in this year, originating in both the north and the south, and spreading rapidly through the entire country. The barbarous practices of the Indians were, as is usual in this most repulsive species of warfare, matched by the repressive measures of the Bolivian troops.

Chile furnished arms and money to uphold the Baptista government; and the dependence of the country without sea coast upon the country all sea coast was recognized in the treaty of 1903. Bolivia had been placed in a position such that any one of her three powerful neighbors,—Chile, Argentina, or Brazil,—could win her allegiance by conferring substantial favors, or even by a display of international courtesy. Following Chile's diplomatic overtures, Argentina undertook to open up a way to the sea by a new railroad connecting the Sierra with her river system. Brazil's attitude remained in doubt, apparently because the territory of Acre, competing with Brazil in the production of rubber, might be demanded as the price of any concession of a right of way. Some of the neighboring states have, in times not long past, actually discussed the disposition to be made of this interesting country, as though it were a South American Poland.

It can hardly be said that Bolivia has given evidence of greater political stability in recent years. When Fernandez Alonzo was elected to the presidency in 1896 his opponents protested that the government had tampered with the returns in such a way as to change the expression of the people's will under the constitutional guaranty of universal suffrage, and an uprising was successful in April 1899. The revolutionists, under Col. José Manuel Pando, defeated the government forces in a pitched battle; President Alonzo fled over the Andes into Chile, and the government which has maintained itself until 1903 was organized, with Señor Pando at its head.

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MARRION WILCOX.

Bolkhov, bōl-kōf', Russia, capital of a district of the same name in the government of Orel, on the Nugra. It is a very ancient place, and is chiefly built of wood. It has manufactures of leather, glue, soap, etc., and a considerable trade in hemp, hemp-oil, and tallow, amounting to more than \$800,000 annually. Pop. (1903) 26,265.

Boll (from the Saxon *bolla*, a bowl), an old Scotch measure for corn, varying in different districts and for different articles. A boll of wheat or beans was equal to four bushels, a boll of oats to six bushels. The boll is still used in some parts of Scotland, but is no longer legally recognized.

Bol'lan, William, lawyer: b. England; d. Massachusetts, 1776. In 1740 he settled in Boston, Mass., married a daughter of Governor Shirley in 1743, and became advocate-general. In 1745 he was sent to London as the colony's agent, a post of great responsibility and requiring considerable ability in the holder. After three years of negotiating he secured from the English government the repayment of £183,649 advanced by Massachusetts for the Cape Breton expedition. In 1769 he secured and sent over to Massachusetts 33 letters of Gov. Bernard and Gen. Gage, denouncing and calumniating the colonists. He wrote a number of political tracts and pamphlets favoring conciliation with the colonists. Among them were: 'The Mutual Interests of Great Britain and the American Colonies Considered'; 'Continued Corruption of Standing Armies'; 'The Free Briton's Memorial, in Defense of the Right of Election'; 'Importance of the Colonies of North America and the Interests of Great Britain with Regard to Them Considered'; 'Petition to the King in Council, 26 Jan. 1774, with Illustrations

BOLLANDISTS — BOLOGNA

tions Intended to Promote the Harmony of Great Britain and Her Colonies'; 'The Importance of Cape Breton Illustrated'; etc.

Bol'landists, a society of Jesuits which published, under the title 'Acta Sanctorum,' the well-known collection of the lives of the saints of the Roman Catholic Church. They received this name from John Bolland (died 1665), who edited the first five volumes from materials already accumulated by Heribert Rosweyd, a Flemish Jesuit, whose collections were entrusted to Bolland at his death in 1629. On the abolition of the society of Jesuits in 1773, it was removed to the monastery of Candenberg, in Brussels. The abolition of the monasteries by Joseph II. brought about its dissolution. A new association was formed in 1837 under the patronage of the Belgian government, and by it the publication of the great work was continued.

Bolles, Albert Sidney, writer on finance: b. Montville, Conn., 8 March 1846. He practised law for a time; then became editor of the Norwich (Conn.) *Bulletin*, and later of the *Banker's Bulletin*. For more than four years he was professor of mercantile law and banking in the University of Pennsylvania, and for eight years chief of the Pennsylvania Bureau of Industrial Statistics. Publications: 'Chapters on Political Economy'; 'Conflict Between Labor and Capital'; 'Industrial History of the United States'; 'Financial History of the United States, 1774-1885,' his most important work; 'Practical Banking'; 'The National Bank Act and its Judicial Meaning'; 'Pennsylvania, Province and State, 1609-1790.'

Bolles, Frank, author: b. Winchester, Mass., 31 Oct. 1856; d. Cambridge, Mass., 10 Jan. 1894. He graduated at Harvard Law School in 1882, and while there founded and became first president of what is now the Harvard Co-operative Association. He was an associate editor of the Boston *Advertiser* until chosen secretary of Harvard University in 1886. That office he made thoroughly human to the great gain of both students and faculty. He was in the truest sense the students' friend, and he endeared himself to hundreds, especially the diffident ones and those of limited means, by many acts of helpfulness. In a series of judicious and clear pamphlets he set forth the actual working of Harvard, its methods of instruction, the scope of its departments, etc., and did much to correct the impression that it was a rich man's college. He wrote three works of exceptional literary merit: 'Land of the Lingering Snow,' sketches written on an abandoned farm in the heart of the White Mountains; 'At the North of Bearcamp Water'; and 'From Blomidon to Smoky, and Other Papers.' In his descriptions of nature and scenery he is absolutely impersonal, and impartial as a scientist; he never moralizes or indulges in sentiment.

Bollman, Eric, adventurer: b. Hoya, Hanover, 1769; d. Jamaica, W. I., 9 Dec. 1821. He was a physician at Paris during the Revolution, accompanied the refugee, Count Narbonne to London in 1792, then established practice in Vienna to discover Lafayette's place of imprisonment. Finding it to be Olmütz, he joined an American named Francis K. Huger in rescuing him, though he was recaptured. Bollman was imprisoned nearly a year in Austria, then re-

leased on condition of leaving the country. He came to America, was in Philadelphia for years, then joined Burr's conspiracy in 1806 and was his agent in New Orleans; was apprehended and committed for treason in 1807, but discharged for lack of evidence (see below). In 1814 he returned to Europe, finally settling in London.

Bollman's Case, in United States law. Eric Bollman (above) was committed on probable suspicion of treason, 27 Jan. 1807, by the circuit court of the District of Columbia; the supreme court was moved for a writ of *habeas corpus ad subjiendum* (the great writ against illegal confinement) to the marshal to bring him before the court. The questions were whether the court had the initial power to grant such writs, and if so, whether it could grant them against committals by the circuit court. John Marshall decided that it had such right both by common law, as the right of any superior court of record to guard the liberty of the citizen, and by express grant from Congress; and that the allegation of treason was immaterial, as the writ would be useless without the power to go behind the lower court's action and decide on the merits. William Johnson dissented. On the marshal's return it was moved that Bollman be discharged, because no place of commission of the treasonable act was cited, and because the evidence was insufficient and the crime even if proved did not amount to treason. It was decided that there must be an actual levying of war, not merely intent to do so to constitute treason, that the evidence at best did not even prove that, but only a culpable attempt against a power with which the United States was at peace, and that if tried he must be so charged, and tried where the offense was committed.

Bollworm, a southern name for a caterpillar which bores into cotton balls. In the north it is called "corn worm," and in the eastern States "tomato worm," from its habits of injuring these products. See COTTON INSECTS.

Bo'lo, the national weapon of the Filipinos. The blade is about 18 inches in length by nearly 3 inches in breadth at its broadest dimension. It tapers from the middle toward the haft as well as toward the point, making it strongly resemble the ancient short sword. It is not double edged, however, but tapers from a thick back to an extremely keen edge. The scabbard of the bolo is made of a native wood with rough outlined designs carved upon it. The whole weapon is much more beautiful in outline and more formidable than the Cuban machete.

Bologna, Giovanni di, jō-vān'ne de bō-lō'-nya, sculptor and architect: b. Douai, in Flanders, about 1524; d. Florence, 1608. At an early age he went to Rome, where he passed two years in studying the masterpieces of art. Going to Florence, he was attracted by the works of Michael Angelo, and determined to pass the rest of his life there. He rapidly rose to the foremost rank among sculptors, and few artists were charged with the execution of so many and such important works. His surname of Bologna seems to have been derived from the celebrated fountain in that city, designed by himself, of which the crowning colossal figure of Neptune is one of the wonders of the modern city. His fine statue of Duke Ferdinand is said to have inspired Browning's poem, 'The Statue and the Bust.'

BOLOGNA — BOLOMETER

Bologna, bō-lō'nyā (anciently BONONIA), capital of the province of the same name. It lies at the foot of the Apennines, between the rivers Reno and Savena, 190 miles north-northwest of Rome. Bologna is five or six miles in circumference, and is surrounded by an unfortified wall of brick. It is an archbishopric, and has a tribunal of appeal in the first instance, and of commerce. It has extensive manufactures of silk goods, velvet, artificial flowers, etc. The town consists of four quarters, the older poorly, and the modern handsomely built. There are colonnades along the sides of the streets affording shade and shelter to the foot-passengers. Bologna was long renowned for its university, founded, according to tradition, by Theodosius the younger in 425, but more probably not till 1088, which, in the centuries of barbarism, spread the light of knowledge over all Europe. It once had 10,000 students, but the number is now about 1,500 only. Here the famous Irnerius taught the civil law in the 11th century, and students were attracted from every quarter. Several learned ladies have at different times been professors here, such as Laura Bassi, professor of mathematics and natural philosophy, and Matilda Tambroni, professor of Greek, and the predecessor of the famous Cardinal Mezzofanti. The university formerly possessed so much influence, that even the coins of the city bore its motto — *Bononia docet* ("Bologna teaches"). The law school enjoyed the greatest fame. Its teachers had the reputation of inculcating principles favorable to despotism, and were consequently rewarded by the favor of the emperors, and of the Italian sovereigns. Every new discovery in science and the arts found a welcome, and here Galvani discovered galvanism (1789). The medical school is celebrated for having introduced the public dissection of human bodies, and the scientific journals prove that the love of investigation is still awake in Bologna. The university, indeed, still enjoys an excellent reputation, and is well provided with scientific collections, the anatomical collection being especially extensive. It possesses in all five faculties. The university library numbers about 170,000 volumes, with 6,000 manuscripts. Since 1803 the university buildings have consisted of what was formerly the Palazzo Cellesi. The original university building now accommodates the public library, of some 200,000 volumes. The city has a picture-gallery (in the Accademia delle Belle Arte) and a museum of archæological and other objects. In the 16th century the famous painters and sculptors, Carracci, Guido Reni, Domenichino, and Albani, founded a school, to which their works have given great reputation. There were, even as early as the 12th and 13th centuries, great painters in Bologna. Francesco Francia was famous in the 15th and early part of the 16th century. The city picture-gallery is rich in the works of these and other artists, the gem of the whole being Raphael's St. Cecilia.

The chief square of the city, Piazza Vittorio Emanuele, formerly the Piazza Maggiore, with the Piazza del Nettuno at right angles, is adorned by several venerable buildings; among them are the Palazzo Comunale (or Del Governo), which contains some magnificent halls, adorned with statues and paintings; Palazzo del Podestà (dating from 1201), now the town hall, chiefly remarkable as having been

the prison of Enzius, king of Sardinia, and son of the Emperor Frederick II., who was captured and kept here by the Bolognese for more than 20 years, till his death; and the church or basilica of St. Petronio, with its unfinished front and the meridian of Cassini drawn upon a copper plate in the floor. Among the hundred other churches, the following are distinguished: St. Pietro (the cathedral), St. Salvatore, St. Domenico (containing the tomb of the saint), St. Giovanni in Monte, St. Giacomo Maggiore, all possessed of rich treasures of art, and St. Stephano, consisting of seven different churches, and partly dating from the 10th century. The palaces are numerous, and were formerly enriched with numerous and valuable works of art. Many of these have now disappeared, though frescoes and other internal decorations still remain. The admired fountain of the Piazza del Nettuno is adorned with a Neptune in bronze, by John of Bologna; in the Piazza Vittorio Emanuele is an equestrian statue of Victor Emanuel II. The leaning towers, Degli Asinelli, and Garisenda, dating from the 12th century, are among the most remarkable objects in Bologna. The former is square and of massive brickwork, built in three portions, and diminishing in diameter to the top. Its height is 321 feet, and its inclination from the perpendicular 4 feet. The Garisenda is 163 feet high, and inclines about 10 feet. Bologna is famous for macaroni, sausage, liqueurs, and preserved fruits. The pilgrimage to the Madonna di S. Luca, whose church is situated at the foot of the Apennines, three miles distant from Bologna, and to which an arcade of 640 arches leads, annually attracts a great number of people from all parts of Italy. This and other places in the environs may be reached by steam tramway.

Bologna was founded by the Etruscans under the name of Felsina, before the foundation of Rome. In 189 B.C. it was made a Roman colony, and called Bononia. On the fall of the Roman empire, it was taken by the Longobards, then it passed into the hands of the Franks, and was made a free city by Charlemagne. In the 12th and 13th centuries it was one of the most flourishing of the Italian republics; but the feuds between the different parties of the nobles disturbed the stable government of the city, and led to its submission to the papal see, and incorporation in the states of the Church, in 1506. Several attempts were made to throw off the papal authority, one of which, in 1831, was for a time successful. In 1849 the Austrians obtained possession of Bologna, and made it the headquarters of their 2d Italian Corps. In 1860 Bologna was by popular vote annexed to the dominions of King Victor Emanuel. Pop. (1899) 158,975.

Bologna Phial, a small flask of unannealed glass, which flies into pieces when its surface is scratched by a hard body or a sharpened body dropped into it. It is prepared by the glass-maker as a test of the condition of a pot of metal before he fashions it into bottles or glasses.

Bolo'gna Stone, or **Bologna Phosphorus**. See **BARIUM** and **BARITE**.

Bolom'eter ("ray-measurer"), an instrument invented by Prof. S. P. Langley, secretary of the Smithsonian Institution, for detect-

ing and measuring small quantities of radiant heat. It consists essentially of a balanced Wheatstone's bridge (see **RESISTANCE**, **ELECTRICAL**), one of whose arms is formed by a thin strip of platinum foil, blackened to facilitate the absorption of heat. The bridge being in equilibrium, with no current passing through the galvanometer, a ray of radiant heat falling upon the platinum strip warms it slightly, thereby increasing its electric resistance, destroying the balance of the bridge, and causing an electric current to flow through the galvanometer. By comparing the current so produced with that produced by a source of heat, the intensity of the radiation of which is known, an estimate may be formed of the quantity of heat received from the body under investigation. The instrument is so delicate that it can detect a change of temperature, in the platinum strip, amounting to the hundred-thousandth part of a degree, Fahrenheit. Prof. Langley considers that it is also capable of measuring small quantities of radiant heat with an error of not more than one per cent. The bolometer was first devised for the purpose of studying the distribution of heat in the solar spectrum, and it has yielded much valuable information on this subject, especially in the infrared regions, where Fraunhofer lines exist, although they are invisible to the eye and can only be photographed with difficulty. For more extended descriptions of the instrument, see 'Proceedings of the American Academy of Arts and Sciences' (1881, Vol. XVI. p. 342); also 'Annals of the Astrophysical Observatory of the Smithsonian Institution' (1900, Vol. I.).

Bolor Tagh, bō-lōr' tæg, also **Bilaur**, or **Belut Tagh**, a mountain range formerly imagined to exist in central Asia between eastern and western Turkestan, as the axis of the continent. At that point, however, there is really a lofty tableland called the Pamir.

Bolsas, a river of Mexico, which, after flowing west, enters the Pacific Ocean, 225 miles southwest of Mexico City.

Bolsec, **Jérôme Hermès**, zhā-rōm hēr-māz bōl-sēc, French writer: b. early in the 16th century; d. 1585. He became first, it is said, a monk, but subsequently embraced the doctrines of the Reformation and became a medical practitioner. After retiring to Italy, and remaining for some time at Ferrara, he repaired to Geneva, and insinuated himself into the good graces of Calvin. A quarrel afterward took place, occasioned, it is said, by the opposition of Bolsec to the doctrine of absolute election. It issued in his imprisonment and ultimate banishment from Geneva. He was driven later on also from Lausanne through the influence of Beza. He latterly returned to France, and having formally abjured Protestantism, settled as a physician in Lyons. He acquired considerable notoriety by the violence of his philippics against Calvin and Beza, in which, under the name of their lives, he has raked together and published all sorts of scandal. This at least is the common view of Protestant writers.

Bolsena, bōl-sā'nā, Italy, a town on the lake of the same name; 56 miles north-northwest of Rome. In the immediate vicinity stood the ancient Volsinium, one of the most powerful of the Etruscan cities. Some remains of its temples, including several granite columns, are still in existence. The lake of Bolsena, which is

supposed to fill an ancient crater, exhales a deadly malaria during the summer season. It is about 9 miles long, 7 miles broad, and 285 feet deep. The shores are formed by finely wooded hills, presenting much beautiful scenery; it has two small islands, called Martana and Bisentina, believed once to have been floating, and it discharges its surplus waters into the Mediterranean by the Marta River.

Bolsward, bōl'svārt, Holland, a town in the province of Friesland, 15 miles southwest of Leeuwarden, at the junction of several canals, and intersected by canals crossed by numerous bridges. The parish church is said to be the largest and finest in Friesland. The trade of Bolsward consists chiefly in cattle, cheese, and butter. Pop. (1902) 6,500.

Bolswert, bōl'svĕrt, **Boetius Adam**, called **Bolswert** after his native place in Friesland, Dutch engraver: b. about 1580; d. 1634. He was the author of many valuable engravings after designs of Bloemaert and Rubens. His younger brother, **SCHELTIUS ADAM**, rose to higher fame in the same art, especially distinguishing himself by his prints after some of the best works of Rubens and Vandyke. Both brothers practised their art at Antwerp.

Bolt Court, a residential court in London, off Fleet Street, near Saint Bride's Church, in which Cobbett and Dr. Samuel Johnson lived for some years.

Bolt-ropes, ropes used to strengthen the sails of a ship, the edges of the sails being sewn to them. Those on the sides are called leech-ropes, the others head and foot ropes.

Boltī, or **Bultē**, an edible chichlid fish of the Nile.

Bolting-cloth, a closely woven fabric, generally of silk, used for sifting flour. See **FLOUR**.

Bolton, **Charles Edward**, American lecturer and writer: b. South Hadley Falls, Mass., 16 May 1841; d. East Cleveland, Ohio, 1901. He inaugurated the Cleveland Educational Bureau; lectured extensively in the United States and Canada; and was mayor of East Cleveland in his latest years. He published: 'A Few Civic Problems'; 'A Model Village' (1901).

Bolton, **Charles Knowles**, American poet and miscellaneous writer, son of Mrs. Sarah Knowles Bolton: b. Cleveland, Ohio, 14 Nov. 1867. He has been librarian of the Boston Athenæum Library from 1898. He has written: 'Gossiping Guide to Harvard'; 'Saskia, the Wife of Rembrandt'; 'The Wooing of Martha Pitkin'; 'Love Story of Ursula Wolcott'; 'The Private Soldier Under Washington' (1903).

Bolton, **Henry Carrington**, American scientific writer: b. New York, 1843. He graduated at Columbia University and studied abroad; became professor of chemistry and natural science at Trinity College, Hartford, Conn. In 1900 he was elected president of the Chemical Society of Washington, D. C. Besides works on chemistry he has written: 'The Counting-Out Rhymes of Children, a Study in Folk-Lore' (1888); 'Literature of Manganese'; 'Students' Guide in Quantitative Analysis'; 'The Evolution of the Thermometer, 1592-1743' (1900).

Bolton, **Sarah Knowles**, American author: b. Farmington, Conn., 15 Sept. 1841. She married Charles E. Bolton (q.v.), lecturer and

BOLTON — BOMBARDIER

philanthropist, and resides in Cleveland, Ohio. She is the author of a number of books, including: 'Girls Who Became Famous' (1886); 'Famous American Authors' (1887); 'Famous American Statesmen' (1888); 'Famous Types of Womanhood' (1892); 'The Inevitable and Other Poems' (1895); 'Our Devoted Friend, the Dog' (1901); etc.

Bolton, Sarah Tittle, American poet: b. Newport, Ky., 18 Dec. 1815; d. Indianapolis, 4 Aug. 1893. She is known for her patriotic and war poems, including 'Paddle Your Own Canoe'; 'Left on the Battlefield'; etc. Her collected 'Poems' appeared in 1865 and 1886.

Bolton, or Bolton-le-Moors, a manufacturing town of Lancashire, England, 10 miles northwest from Manchester. It consists mainly of two divisions, Great Bolton and Little Bolton, separated from each other by the river Croal. The older portion of the two contains many narrow and irregular streets, but by far the larger portion of the town is modern. About \$2,500,000 has been recently expended in street improvements. The finest of the public edifices is the town-hall, in the Grecian style, with a tower 220 feet high, fronting a spacious square, and erected at an expense of about \$1,000,000. Among other public buildings are one of the finest market-halls in England, costing, with its approaches, nearly \$500,000; a church institute; a temperance-hall; commodious baths; savings-bank; two theatres; two technical schools; a post-office, gas offices, county court, infirmary and children's hospital; orphanages; Chadwick and Mere Hall museums; board schools; poor-law offices, etc. The religious edifices are numerous, and some of them of fine architectural appearance. Foremost among these is St. Peter's parish church, a modern cruciform building in the Decorated style, with a tower at the western end 150 feet high. The schools are numerous and well attended, and, under the school board, education is rapidly improving. There is a free grammar-school, founded in 1641. The Bolton Free Public libraries (six in number) contain over 93,000 volumes. There are now four parks and three recreation grounds belonging to the town. In manufacturing industry Bolton is surpassed by few places in the kingdom, the cotton manufacture being its staple. It contains some of the largest and finest cotton mills in the world. In the town itself there are some 370 factories, of which nearly 140 are cotton mills and establishments for the weaving of cotton fabrics. The yarns spun in Bolton are generally fine, and a great variety of fancy goods are produced, besides plain calicoes. Bleaching is also carried on to a great extent, there being over 20 bleaching grounds, some of them very large. There are also several large engineering works, employing a great many hands. Besides these there are collieries, paper mills, foundries, chemical works, and various other works. Bolton is of considerable antiquity, having been raised to the dignity of a market-town in 1256. It returns two members to Parliament. Pop. (1901) 168,205.

Bolton Abbey, a famous English Abbey in Yorkshire; in a highly picturesque district on the river Wharfe, six miles east of Skipton, and 21 miles northwest of Leeds. Founded for Augustinian canons about 1150, it has been celebrated by Wordsworth in 'The White Doe of

Rylstone' and 'The Force of Prayer.' The eastern end is a ruin, but the nave is utilized for the purposes of a parish church.

Bolzano, Bernhard, Bohemian Roman Catholic theologian and philosopher: b. Prague, 5 Oct. 1781; d. 18 Dec. 1848. From 1805 to 1820 he was professor and chaplain at the University of Prague, but was accused of insidiously instilling into the minds of the students the heresies of Schelling and Hegel, and was dismissed from his office. He left many writings, of which his 'Wissenschaftslehre' (1842) is the most important. See 'Autobiography' (1875).

Boma, the capital of the Congo Free State, on the left bank of the Congo River, which till 1876 was the extreme inland post of the Dutch and Portuguese traders. It contains the establishment of the governor-general and also the local government of the administrative district of the same name.

Bomarsund, a narrow channel between the islands of Aland and Vardo, at the entrance of the Gulf of Bothnia. The Russian fortifications to the harbor of Bomarsund were destroyed by the British and French fleets during the war of 1854. The channels leading up to Bomarsund were blockaded at the end of July by four British ships and a few small steamers. Shortly afterward strong detachments of the allied fleets arrived, with the admirals Napier and Parseval-Deschênes, followed, 7 August, by the line-of-battle ships with Gen. Baraguay d'Hilliers and 12,000 troops, mostly French. The Russian commander, Gen. Bodisco, was compelled to surrender on 16 August, the allies continuing to occupy the island until the end of the month, when the whole of the fortification was blown up. The trophies of the victors were 112 mounted guns, 79 not mounted, 3 mortars, 7 field guns, and 2,235 prisoners. The principal military interest offered by this siege is its setting completely at rest the question as to the employment of uncovered masonry in fortifications with land-fronts.

Bomb, a hollow, cast-iron ball or shell, filled with gunpowder or other combustible, and exploded by means of a time-fuse, being commonly thrown from a mortar. Instead of spherical bombs, elongated shells fired from rifled guns are now in general use. See also AMMUNITION; PROJECTILES.

Bomb Lance, a harpoon used in whale fishing which carries a charge of explosive material in its head. In one form of the weapon the arrangement is that when the harpoon strikes the fish, the bar, which is pivoted obliquely in the head of the instrument, shall serve to release a spring acting on the hammer, which then explodes the cap and bursts the charge chamber.

Bomba, a title conferred upon King Ferdinand II. of Naples and by which he will be remembered in history. This appellation he received from the violation of his solemn oath to the citizens of Palermo, which city he perfidiously bombarded in September 1848; thus outraging his own plighted word, the laws of humanity, and the constitutional policy he had sworn to observe.

Bombard. See ARTILLERY; ORDNANCE.

Bombardier, originally an artillery soldier whose special duties are connected with the loading and firing of shells, grenades, etc., from

BOMBARDIER-BEETLE — BOMBAY

bombards, mortars, or howitzers. Bombardier is now the special title of a non-commissioned officer in the British artillery ranking with a corporal.

Bombardier-beetle, or **Artillery-beetle**, an insect of the genus *Brachinus*, and family *Carabida*. The head is narrow, the prothorax heart-shaped. While certain other beetles have at the end of the body two glands which secrete a malodorous fluid which they eject as a means of defense against their enemies, in the bombardier-beetle this fluid or spray appears to be charged with a gas, which, on coming in contact with the air, looks like smoke, and is ejected with an explosion like that of a miniature pop-gun. This gas-like vapor and detonation baffles and discomfits the pursuer (most often some other predatory beetle) as if blinding it. When being captured they will fire off this discharge several times. Several of the species (*B. fumans* and allies) are yellowish-red, with bluish and greenish elytra.

Bombardment, the act of throwing bombs or shells into a town or fortress for incendiary purposes. A bombardment is either desultory, when ships, field batteries, or a proportionately small number of siege batteries, throw shells into a place in order to intimidate the inhabitants and garrison into a hasty surrender, or for some other purpose; or it is regular, and then forms one of the methods of conducting the attack of a fortified place. The attack by regular bombardment was first introduced by the Prussians in their sieges in 1815, after Waterloo, of the fortresses in the north of France. The army and the Bonapartist party being then much dispirited, and the remainder of the inhabitants anxiously wishing for peace, it was thought that the formalities of the old methodical attack in this case might be dispensed with, and a short and heavy bombardment substituted, which would create fires and explosions of magazines, prevent every soul in the place from getting a night's rest, and thus in a short time compel a surrender, either by the moral pressure of the inhabitants on the commander, or by the actual amount of devastation caused, and by out-fatiguing the garrison. The regular attack by direct fire against the defenses, though proceeded with, became secondary to vertical fire and shelling from heavy howitzers. In some cases a desultory bombardment was sufficient, in others a regular bombardment had to be resorted to; but in every instance the plan was successful; and it is now a maxim in the theory of sieges, that to destroy the resources, and to render unsafe the interior of a fortress by vertical fire, is as important (if not more so) as the destruction of its outer defenses by direct and ricochet firing. A bombardment will be most effective against a fortress of middling size, with numerous non-military inhabitants, the moral effect upon them being one of the means applied to force the commander into surrender. Before bombarding a town, it is customary to give 24 hours' notice thereof, to allow women, children, and non-combatants to leave it. Modern bombardments have not usually been particularly destructive. During the siege of Paris, 1870-71, some 500

shells were thrown into the city by the Germans, but relatively little mischief was accomplished by them. A similar result was shown at the bombardment of Santiago de Cuba by the American forces in 1898, and also in the long sieges of Ladysmith and Kimberley in 1899-1900. See also SIEGE.

Bombardon, a large brass musical instrument of the sax-horn kind, and the lowest of these instruments. It is made in more than one size, and the largest is generally of circular form and big enough to go round the body of the performer. It is not capable of very rapid execution.

Bombastes Furioso, a burlesque opera by William Barnes Rhodes, produced in 1790 and intended as a parody of 'Orlando Furioso.' Its name is that of the principal personage, a braggard who kills his king, Artaxominous, for a pair of jack-boots.

Bombax (SILK COTTON TREE), a genus of 10 or 12 tropical trees of the natural order *Malvaceæ* with digitate leaves and large scarlet or white axillary flowers. *B. ceiba*, the five-leaved silk cotton tree, attains a great height in tropical America, where it is native and where its immense trunks are scooped out for canoes. This species, *B. munguba*, another South American species, and *B. malabaricum*, the red silk cotton tree, so named from the color of its "cotton," bear pods which furnish a fibre useful for stuffing cushions; hence the common name. All the species yield useful bast employed in rope making, and have been suggested as possibly valuable for paper making.

Bombay, a presidency of British India, stretching along the west side of the peninsula, and bounded on the land side by Baluchistan, the Punjab, Rajputana, native states of the Central India Agency, the Central Provinces, Berar, Haidarabad, Madras, and Mysore; and on the west by the Arabian Sea. The divisions are: Sind, the least populous, Gujerat, the most populous, Deccan, Konkan, and Karnatik. The presidency also includes many feudatory states. The chief towns are Bombay, Poona, Ahmedabad, Surat, and Karachi. The chief spoken languages are Marathi, used by nearly half the population; Gujrathi, used by the commercial classes; Kanarese, and Sindhi. About three fourths of the population profess Hinduism, fully one sixth are Mohammedans, the rest being Jains, Christians, Sikhs, Parsees, aboriginals, etc.

The chief openings in the coast of Bombay are the gulfs of Cambay and Cutch, separated by the peninsula of Kathiawar. The chief harbors are those of Bombay and Karachi. The river Nerbudda which enters the Gulf of Cambay, divides the province into two physically distinct parts. North of it are Gujerat and Sind, with the peninsulas of Cutch and Kathiawar, mostly a fertile alluvial plain. Much of Sind, however, is a desert, crossed by low sand-hills. South of the Nerbudda, the province presents a narrow flat strip of coast, rising inland toward the upland country of the Western Ghats and the Deccan. The chief mountain ranges are the Hala Mountains, west of the Indus, the Western Ghats, running north and south, and the Satpura range, separating the basins of the Nerbudda

BOMBAY — BOMBON

and the Taptee. The most important rivers are the Indus, Nerbudda, and Taptee, all of which flow into the Arabian Sea; the Godavari and Kistna rise on the eastern slopes of the Ghats. Many short torrential rivers traverse the Konkan coastal strip. The forests of Sind consist chiefly of sisu, babul (a kind of acacia), bhan (a species of poplar), and tamarisk; while from the forests of the western slopes of the Ghats are obtained teak, blackwood, ebony, ironwood, babul, sandalwood, and other valuable timbers. The cocoanut and date palms, mango, jack, betel-nut, and myrobalans are other important indigenous vegetable products. Among the wild animals are the maneless lion of Gujerat, the wild ass, leopard, tiger, black bear, bison, antelopes, and venomous snakes. The climate varies greatly from one district to another, two extremes, being represented by Upper Sind, with great heat and little rain, and the Konkan, with excessive rainfall, especially from June to October. The chief agricultural productions are cotton, rice, millet, wheat, barley, dates, the cocoa-palm, oil-seeds, sugar, and indigo. The area of the presidency under British administration is 124,122 square miles. Pop. of British portion of the presidency (1901) 18,584,496, and of the native states, 6,891,691. See Drew, 'Bombay and Its Feudatories' (1892); Douglas, 'Glimpses of Old Bombay and Western India' (1900). The growth of cotton in Bombay received a great impetus during the American Civil War; and although the great demand did not prove lasting, cotton continues to be a highly important crop, part of the produce being exported, and a considerable portion of it worked up in the cotton-mills of Bombay. The total number of pupils receiving education at primary and other schools amounts to about 750,000, of whom only about one eighth consist of females. The annual revenue largely exceeds the expenditure, and latterly has amounted to about \$75,000,000.

Bombay, a city and seaport on the west coast of India, capital of the presidency of the same name, situated at the southern extremity of the island of Bombay, and connected with the mainland and the interior by extensions of the Bombay and Baroda, and the Great Indian and Peninsula Railways, the terminus of the latter being a splendid edifice which cost \$15,000,000. Extensive water-works have been constructed on the mainland, including a dam two miles in length, and were opened in 1892. The town comprises two main portions, one known as the Fort, and formerly surrounded with fortifications, on a narrow point of land with the harbor on the east side and Back Bay on the west; the other known as the City, a little to the northwest. The European population live partly in the Fort quarter, but mostly in villas surrounded with extensive areas, called compounds, in various parts of the island. Bombay has many handsome buildings, both public and private, and a number of fine streets, the latter being in many cases traversed by street railways. The castle, the government offices, and almost all the merchants' warehouses and offices are in the Fort. On the esplanade facing southwest

is a fine range of public buildings, including the secretariat, the new high court, the offices of the public works department, the post and telegraph offices, etc. There are a cathedral and several other churches in Bombay, which is the see of an Anglican bishop. There are also some fine hotels. In 1859 a university was opened. Various industries, such as dyeing, tanning, and metal working, are actively carried on, and there are now nearly 100 cotton-mills. The commerce of the port is very extensive, by far the greater portion of the exports and imports of the presidency passing through Bombay. The chief article of export is raw cotton, the chief import cotton piece goods, the commerce being chiefly with Great Britain. The harbor is one of the largest and safest in India; while its scenery and that of the neighboring continent presents a rare combination of grandeur and beauty. It is situated between the islands of Colabah, Bombay, and Salsette on the one hand, and the mainland and islands of Caranjah and Elephanta on the other. There are large and commodious docks, the ships and basins being calculated for vessels of any size. There is a large traffic with steam vessels between Bombay and Great Britain, and regular steam communication with China, Australia, Singapore, Mauritius, etc. A railway between Bombay and Tannah, on the island of Salsette, 20 miles distant, opened in 1853, was the first Indian railway constructed. Pop. (1901) 770,800. The island of Bombay is about 11 miles long from north to south, and about three miles broad, formed by two ranges of rock running parallel to each other on opposite sides of the island. The interior was formerly liable to be overflowed by the sea, to prevent which substantial walls and embankments were constructed.

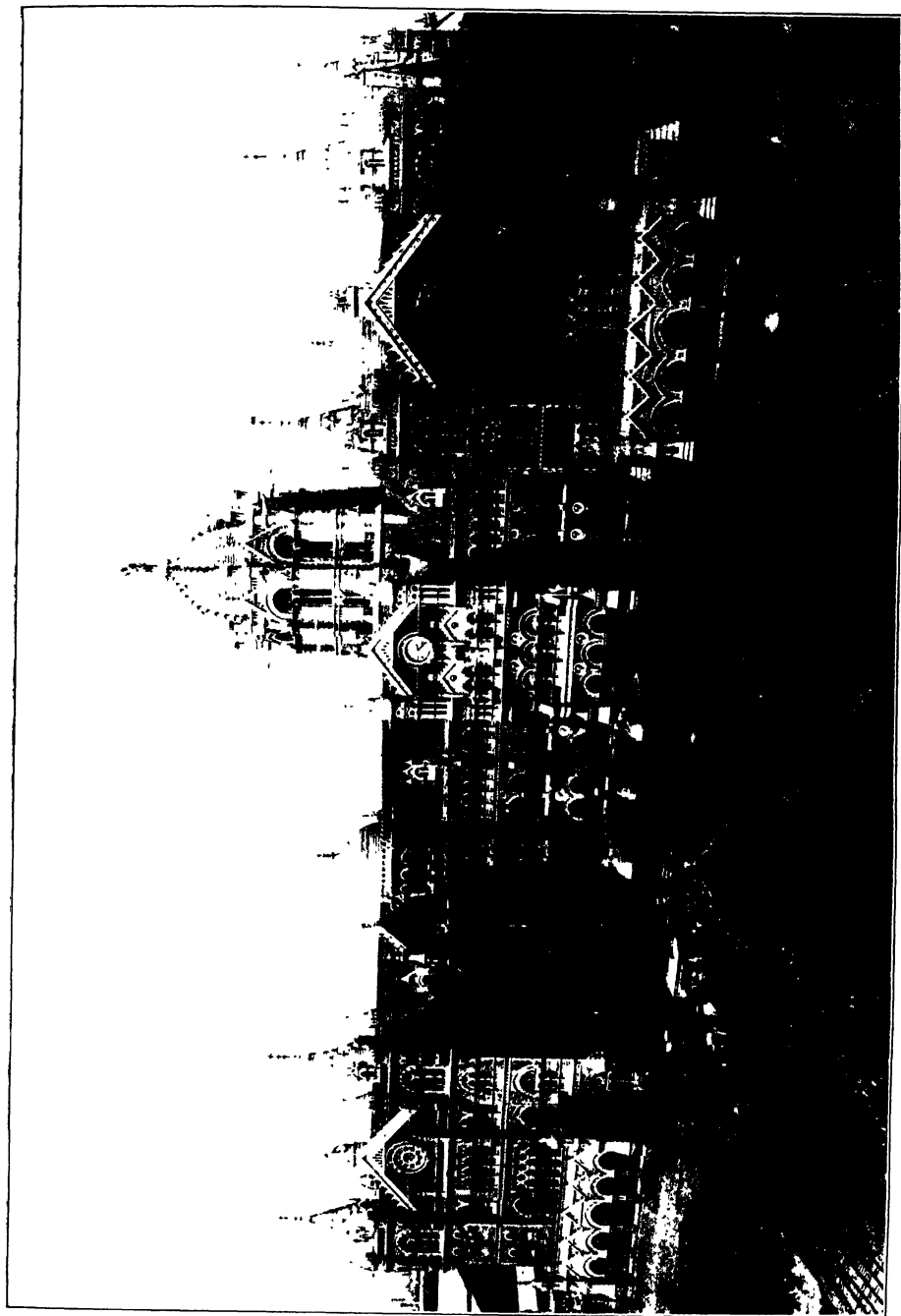
Bombay was obtained by the Portuguese in 1530 from an Indian chief at Salsette; by them it was ceded to Great Britain in 1661, and in 1668 it was transferred to the East India Company. Next to Madras it is the oldest of the British possessions in the East, and from the commencement of the last century has gradually increased in importance.

Bombay Duck. See BUMMALOTI.

Bombazine, derived from *bombyx*, the Greek term for silk and silkworm, is a mixed tissue of silk and worsted, and was long woven both plain and colored. The latter, however, has gone into disuse, and the only color now used is black, for which there is an extensive demand in Spain and South America, where some of the religious orders use it, and it generally forms the material of the almost universally worn Spanish *mantilla*. The manufacture was originally introduced into England by a colony of Dutch or Flemings, who settled in Norfolk, and long continued to have its principal seat at Norwich, the capital of that county, though it is now chiefly confined to Halifax and Kidderminster.

Bombon, Philippines, a large, fresh water lake in the island of Luzon, about 50 miles south of Manila. It is 105 square miles in area. There is a small island in the centre, from which rises the volcano Taal, whose height is only 850 feet. The waters of the lake find an outlet to the sea through the Pansipit River.

BOMBAY.



VICTORIA RAILWAY STATION.

BOMBPROOF — BONALD

Bombproof, a structure intended to resist or repel artillery shot and shell. When designed for permanency they are either of masonry or cut from solid rock, but temporary bombproofs are constructed of earth and timber, or other available material. See also **BLINDAGE**.

Bombycidae, a group of genera comprising some of the largest and most regal of moths. Their thick, heavy bodies and small sunken heads, the mouth parts often obsolete, the tongue either wholly or partly atrophied; the broadly pectinated antennae; the broad, often falcate, wings; and their sluggish habits, afford good characters for distinguishing them. The larvæ are silk-worms, or "spinners." They are often thick, usually more hairy or spiny than those of other groups of moths, or as in the Chinese silk-worm, smooth; while in the large *Attacus ablas*, *Telea polyphemus*, *Samia cecropia* and *Tropæa luna*, the worms are short, fat, fleshy, and sluggish. They spin a more or less dense cocoon of silk to protect the enclosed pupa from sudden changes in the weather. Although the name *Bombycidae* is confined to the small group represented by the silk-worm (*Bombyx mori*), all the typical spinners are referred to as bombycine moths. The most typical families are the *Notodontidae*, *Sphingicampidae*, *Saturniidae*, and *Remileucidae*. Of these the *Sphingicampidae*, however, like the *Sphingidae*, to which they may have given origin, spin no cocoon and transform in the earth, the pupa being subterranean (see also **SILKWORM**). Consult: Packard, 'Monograph of the Bombycine Moths' ('Memoirs of the National Academy of Sciences,' Vol. VII., Washington, 1895).

Bomford, George, American soldier: b. New York, 1780; d. Boston, Mass., 25 March 1848. He graduated at West Point in 1805 and was assigned to the Engineer corps. Between 1805 and 1812 he worked on the fortifications of New York harbor, the defenses of Chesapeake Bay, and was superintending engineer of the works on Governor's Island. During the War of 1812 he was brevetted lieutenant-colonel for distinguished service in the ordnance department. He introduced bomb cannons, made on a pattern of his own invention, which were called Columbiads, a kind of heavy gun combining the qualities of gun, howitzer, and mortar. On 30 May 1832 he was appointed chief of ordnance, and on 1 Feb. 1842 became inspector of arsenals, ordnance, arms, and munitions of war, in which duty he continued until his death. See Cullum, 'Officers and Graduates of the United States Military Academy' (Vol. I. 1868).

Bon Marché, *bôn mâr-shâ*, one of the large department stores of Paris, situated on the Rue de Bac and Rue de Sèvres. It was founded in 1853 by Aristide Boucicault as a small store in the Rue de Bac and grew little by little to be the great establishment it now is. The present building has begun in 1869, was first used in 1872, and has been enlarged at various times since then. The management is co-operative. Pensions from \$120 to \$300 a year are given to men after the age of 50, and women after 45, and there is a regular system of promotion. It is thought that this organization has contributed largely to the success of the store.

Bona, Giovanni, Italian cardinal: b. Mondovì, Piedmont, 10 Oct. 1609; d. Rome, 27 Oct. 1674. He was renowned for his piety and learning, a collaborator in the 'Acta Sanctorum,' the author of 'Rerum Liturgicarum,' which is an authority on the service of mass, and of 'De principiis vitæ Christianæ,'—a book which has frequently been compared to the 'Imitation of Christ,' and of which a French translation has appeared (1854-5).

Bona Dea, the good goddess, a mysterious divinity of the Roman mythology, the wife or the daughter of Faunus. Her worship was secret, performed only by women; men were even required to ignore her name. Her sanctuary was in a cavern in the Aventinian hill, but her festival, which occurred 1 May, was celebrated in a separate room in the dwelling of the consul who then had the fasces. No man was allowed to be present, and all male statues in the house were covered. The wine used at this festival was called milk, and the vessel in which it was kept, *mellarium*. After the sacrifices, bacchanalian dances were performed. According to Juvenal, licentious abominations marked these festivals. The snake was the symbol of the goddess, and this would point to her being considered as possessing a curative, medical power, and in her sanctuary various herbs were offered for sale. By the Greeks the Bona Dea was identified with Hecate, Semele, or other divinities.

Bona Fide, a technical legal expression, to which the law of Great Britain and this country has annexed a certain idea. It is a term used in statutes in England and in acts of the legislature of all the United States, and signifies a thing done really, with a good faith, without fraud or deceit, or collusion or trust. The words *bona fide* are restrictive, for a debt may be for a valuable consideration and yet not *bona fide*. A debt must be *bona fide* at the time of its commencement or it can never become so afterward. If a contract be made with good faith, subsequent fraudulent acts will not vitiate it, although such acts may raise a presumption of antecedent fraud and thus become a means of proving the want of good faith in making the contract.

Bonacci-Brunamonti, Maria Alinda, *mă-ē'ă ā-lên'dă bō-nă'chē-broo-nă-môn'tē*, Italian poet: b. Perugia, 1842. She was only 14 years old when her first 'Collection of Poems' appeared and attracted much attention. Her 'National Songs' (1859-78) were inspired by Italy's struggle for freedom.

Bonald, Louis Gabriel Ambroise, *loo-ē gâ-brē-ēl an-brwâz bō-nâl* (VICOMTE DE, *vê-cônt dē*), French philosopher: b. 1754; d. 1840. During the Revolution he joined the Royalist army under the Bourbon princes. He returned to France under Napoleon; became co-editor of the *Mercure* with Chateaubriand and Ficvée, and in 1808 was appointed minister of public instruction. After the Restoration,—as the deputy for his department,—he voted with the Ultramontane or Theocratic party in the Chambre Introuvable, and in his political career, as in his philosophical works, was the ardent advocate of absolutism, of the infallibility of the Pope, and of the Jesuits. In 1830 he refused to take the oath of allegiance to the new dynasty.

BONANNO — BONAPARTE

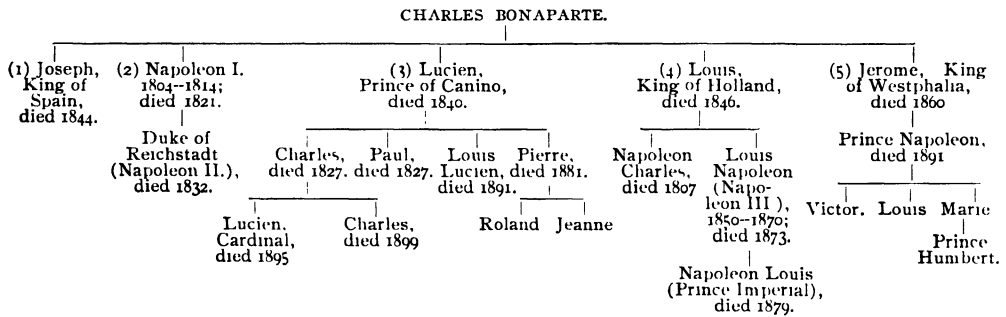
Bonanno, bō-nān'nō, Italian architect and sculptor. In 1174 he commenced, with Wilhelm of Innsbruck, the famous Leaning Tower of Pisa. He was also the designer of the celebrated bronze doors of the cathedral of that city, which were, all but one, destroyed by a conflagration in 1596.

Bonaparte, or **Buonaparte**, the name of a Corsican family — a name now as well known as any in history. It was spelt Buonaparte by the Emperor Napoleon and his father till 1796, though the more usual, modern form also occurs in old Italian documents. Several families are mentioned as early as the 12th century who bore the name of Bonaparte, and who took a position of some prominence in the history of Italy. In 1122, for instance, a Bonaparte was banished from Florence as a Ghibelline. Corrado Bonaparte is mentioned in 1170 and Jacopo Bonaparte in 1210 as knights of the Order of the Golden Spur. The office of *podestà* was held by Nordio Bonaparte in Parma in 1272, by Pietro Bonaparte in Padua 1285, and by Giovanni Bonaparte in Florence 1333. In 1250 a Bonaparte was syndic of Ascoli, and in 1440 Cesare Bonaparte was chosen as head of naval affairs at Sarzana. A

of Ajaccio in the senate of Genoa, and in 1614 Francesco was chosen captain of his native town. In 1757 Joseph, the grandfather of Napoleon I., received a formal patent of nobility from the Grand Duke of Tuscany. About the middle of the 18th century there remained three male representatives of the family of Bonaparte at Ajaccio, the archdeacon Lucien Bonaparte, his brother Napoleon, and their nephew Charles, who became father of the Emperor Napoleon I. and of a numerous family of princes.

Bonaparte, Charles, father of the Emperor Napoleon I. b. Ajaccio, Corsica, 29 March 1746; d. Montpellier, 24 Feb. 1785. He was carefully educated, studied law at Pisa, and soon after his return married without the consent of his relatives Letitia Ramolino, a beautiful patrician. He fought under Paoli for the independence of Corsica, but resistance to the French proving useless he went over to their side. In 1771, when Louis XV. caused 400 Corsican families to be selected who alone were to be considered noble, the Bonaparte family, — and consequently Charles, — was among the number. By the influence of the French governor, Marbœuf, who was very friendly toward the family,

THE BONAPARTE FAMILY (*Male Issue*).



Giovanni Bonaparte is said to have married a niece of Pope Nicholas V. in 1404, but this seems doubtful for chronological reasons. It is however certain that about 1454 Niccolo Bonaparte was ambassador of this Pope to several courts, and vicar of the Holy See in Ascoli. Another Niccolo Bonaparte, professor at San Miniato in the 16th century, is stated to have been the author of the comedy 'La Vedova' (Florence 1568); and a work on the Sack of Rome in 1527 is attributed to the Tuscan Giacomo or Jacopo Bonaparte, who was an eyewitness of the event. The connection between these different Bonapartes is by no means well established; yet in 1771 the relationship of the Corsican Bonapartes with the Florentine Bonapartes was judicially recognized. In Corsica itself a Messire Bonaparte appears as witness to an act executed by Berengar II. of Italy as early as 947, and it is therefore not improbable that the family originally emigrated from this island to the mainland, and that a branch of the Genoese line returned to their old home in the 16th century. From the time of Gabriel Bonaparte, who settled at Ajaccio in 1567, and took part in the naval expeditions against the Moors, the Bonapartes ranked as a patrician family of that town. In 1576 Girolamo Bonaparte was elected deputy

he was (1773) named royal councillor and assessor for the town and province of Ajaccio. As a member of the deputation of Corsican nobles sent to the court of France in 1777 he resided several years at Paris, and was fortunate enough to secure a free admission for his eldest son, Joseph, to the seminary at Autun, another for his second son, Napoleon, to the military school of Brienne, and a third for his daughter, Maria Anna, to the educational institution at St. Cyr. He returned to Corsica in 1779, and afterward went to Montpellier for the benefit of his health, but did not recover. By his marriage with Letitia Ramolino he left eight children; Joseph (see BONAPARTE, JOSEPH), king of Spain; Napoleon I., emperor of the French (see NAPOLEON I.); Lucien (see BONAPARTE, LUCIEN), prince of Canino; Maria Anna, afterward called Elise, princess of Lucca and Piombino, and wife of Prince Bacciocchi (see BACCIOCCHI, FELICE PASQUALE); Louis (see BONAPARTE, LOUIS), king of Holland; Carlotta, afterward named Marie Pauline, Princess Borghese (q.v.); Annunciata, afterward called Caroline, wife of Murat (see MURAT), king of Naples; and Jerome (see BONAPARTE, JEROME), king of Westphalia. See also BONAPARTE, LETITIA RAMOLINO.

BONAPARTE

Bonaparte, Jerome, youngest brother of Napoleon: b. Ajaccio, Corsica, 15 Nov. 1784; d. near Paris, 24 June 1860. At an early age he entered the French navy as a midshipman. In 1801 he was sent out on an expedition to the West Indies, but the vessel being chased by English cruisers, was obliged to put in to New York. During his sojourn in America, Jerome Bonaparte became acquainted with Miss Elizabeth Patterson, the daughter of the president of the Bank of Baltimore, and a descendant, as is asserted, of "Old Mortality," immortalized by Sir Walter Scott. His addresses to this young lady having been accepted, they were married 24 Dec. 1803, according to the Roman Catholic ritual, in the cathedral of Baltimore, and in 1805 embarked for Europe. This marriage of his brother did not meet the approval of the Emperor Napoleon, whose ambitious views it thwarted, and he accordingly, after an ineffectual application to Pope Pius VII. to have it dissolved, issued a decree declaring it to be null and void. On 12 Aug. 1807, Jerome was married to Catherine Sophia, Princess of Wurtemberg, and a few months afterward was created king of Westphalia, and crowned with great pomp at Cassel, 1 Jan. 1808. His government was not marked by much judiciousness or prudence; little regard was paid to national feelings, and the finances of the state, both from mismanagement and the frequency of hostile incursions, became ere long involved in hopeless embarrassment. The battle of Leipsic put an end to Jerome's reign, and he was obliged to take flight to Paris. On the conclusion of the Treaty of Paris he left France, and proceeded first to Switzerland, thence to Gratz, and in the beginning of 1815 to Trieste. On his brother's return from Elba he again proceeded to Paris, and was nominated a peer of France. At the battles of Ligny and Waterloo he was actively engaged, and displayed considerable bravery, besides receiving a wound in the arm. On Napoleon's overthrow he retired first to Switzerland, then to Wurtemberg, and from this period up to the fall of Louis Philippe, in 1848, resided in different parts of Europe under the title of the Comte de Montfort, and latterly chiefly in Florence. On the outbreak of the revolution of February 1848 he returned to Paris, and was appointed (23 December) governor-general of the hospital of the Invalids, and in 1850 a marshal of France. In 1852 he was made president of the Senate. Reference has already been made to the two successive marriages contracted by Jerome Bonaparte. From his union with Miss Patterson only one son proceeded, Jerome (see BONAPARTES OF BALTIMORE). By his second wife Jerome Bonaparte had three children. The elder son, **JEROME BONAPARTE**, b. 1814, d. 1847 **MATHILDE BONAPARTE**, Princess of Montfort (b. Trieste, 27 May 1820), married the Russian Count Anatol Demidoff, and lived at the court of Louis Napoleon during his presidency. The younger son, **NAPOLEON JOSEPH CHARLES PAUL BONAPARTE**, commonly known as **PRINCE NAPOLEON** (b. Trieste, 9 Sept. 1822; d. 18 March 1891), passed his youth in Italy; entered the military service of Wurtemberg in 1837; afterward traveled in several countries of Europe; and was banished from France (1845) on account of his intercourse with the Republican party. After February 1848 he was elected to the National Assembly. He commanded an in-

fantry division at the battles of Alma and Inkermann. In 1859 he married the Princess Clotilde, daughter of Victor Emmanuel, by whom he had two sons (see **BONAPARTE PRETENDERS**), and a daughter. After the fall of the empire he took up his residence in England, but returned to France in 1872. On the death of the Prince Imperial, son of the Emperor Louis Napoleon, in Zululand in 1879, the eldest son of Prince Napoleon became the heir of the Bonapartist hopes. When, in 1886, the chiefs of the Bourbon family were, by a vote of both chambers, expelled from France, Prince Napoleon and his eldest son were exiled also as pretenders to the throne.

Bonaparte, Joseph, eldest brother of Napoleon I.: b. Corte, Corsica; d. Florence, Italy, 28 July 1844. He was educated in France at the college of Autun, returned to Corsica in 1785 on his father's death, studied law, and in 1792 became a member of the new administration of Corsica under Paoli. In 1793, after Paoli had called in English aid, he emigrated to Marseilles, and became brother-in-law to Bernadotte, afterward king of Sweden, by marrying one of the daughters of a wealthy banker named Clari. In 1796 he accompanied the army of Italy as commissary. In 1797 was elected a Corsican deputy to the Council of Five Hundred, and shortly after was sent by the Directory ambassador to the Pope. He returned abruptly, and had not long resumed his seat in the Council of Five Hundred, when his brother having become First Consul he was made councilor of state, and employed to negotiate a treaty with the United States. Shortly after, in 1801, he negotiated the peace of Luneville with the emperor of Germany, and in 1802 that of Amiens with Great Britain. Napoleon having now begun to deal out kingdoms among his family, Joseph was made king of Naples and Sicily in 1806, but had reigned only two years when his brother recalled him, and sent him to Madrid to be king of Spain and the Indies. His seat at Naples had not been comfortable, and he now found himself on a bed of thorns. His kingship lasted nominally for five years, but he was chased once and again from his capital, and the third time, in 1813, fled not to return. In these appointments Joseph was merely a tool in his brother's hands. In 1814, after the fatal expedition to Russia, Napoleon on setting out for the army made him lieutenant-general of the empire, and head of the council of regency. This was his last office of any consequence. After the battle of Waterloo he sailed for the United States and lived for some years at Bordentown, N. J., where he employed himself in agriculture, and was highly esteemed by his neighbors. During his exile he assumed the title of Count de Survilliers. In 1832 he went to England and after residing there for some time repaired to Italy, and spent his closing days in Florence. His wife appears to have been prevented by ill health from accompanying him to the United States. She survived her husband but a few months. There were two daughters. The eldest became the wife of the eldest son of Lucien Bonaparte, and the second was married to the second son of Louis Bonaparte.

Bonaparte, Letitia Ramolino, mother of Napoleon, and hence known by the name of **MADAME MÈRE**: b. Ajaccio, Corsica, 24 Aug.

BONAPARTE

1750; d. Rome, 2 Feb. 1836. She was married in 1767 to Charles Bonaparte (see BONAPARTE, CHARLES). Left a widow in 1785, she continued to reside in Corsica till 1793, when she removed to Marseilles. In this city she lived in straitened circumstances. After her son became First Consul, she fixed her residence at Paris, had a separate establishment assigned to her, and lived in considerable state, though somewhat retired. All things considered, she conducted herself with great discretion, performing her part becomingly in the station to which she had been so unexpectedly elevated, and yet never allowing herself to forget that in the necessary course of events the sudden rise of her family might one day be terminated by an equally sudden fall. When the fall came she retired to Rome, and collecting most of the surviving members of her family around her, lived to the very advanced age of 86.

Bonaparte, Louis (COUNT OF ST. LEU), second younger brother of the Emperor Napoleon I., and father of Napoleon III.: b. Ajaccio, Corsica, 2 Sept. 1778; d. Leghorn, Italy, 25 July 1846. He was educated in the artillery school at Chalons, accompanied Napoleon to Italy, and afterward to Egypt, but without distinguishing himself in any special manner. He subsequently rose to the rank of a brigadier-general, and in 1802 married Hortense Eugénie Beauharnais, Napoleon's step-daughter (see BEAUHARNAIS, HORTENSE EUGENIE). In 1806, on Schimmelpenninck, grand pensionary of Holland, demitting his office, Louis Bonaparte was compelled by his brother, notwithstanding his protestations, to accept the Dutch crown. The difficult situation in which he was placed rendered it impossible for him to be anything else than a mere viceroy of Napoleon; but to his credit it must be recorded that he exerted himself to the utmost in promoting the welfare of his new subjects, and resisted as far as in him lay the tyrannical interference and arbitrary procedure of France. With all his efforts, however, he found himself unable to restore the finances of the country to a healthy condition: a quarrel took place between him and his brother relative to the continental system maintained by the latter, which had proved most injurious to Dutch commerce, and he ultimately, on 1 June 1810, abdicated the sovereignty, and retired to Grätz under the title of the Count of St. Leu. Holland was thereupon annexed to France. In 1814 Louis paid a visit to Paris, and strongly counseled his brother to make peace with the allies. After the Restoration he took up his abode at Rome, and separated himself from his wife, Hortense, a disunion which continued throughout his life. In 1826 he removed from Rome to Florence, and from thence, a short time after his son's escape from the fortress of Ham, to Leghorn, where his literary abilities were considerable, and he was the author of a novel entitled '*Marie, les Peines de l'Amour ou les Hollandaises*'; and '*Documents historiques et Réflexions sur le Gouvernement de la Hollande*'; etc.

Bonaparte, Lucien (PRINCE OF CANINO), next younger brother of Napoleon I.: b. Ajaccio, Corsica, 21 March 1775; d. Viterbo, Italy, 29 June 1840. He emigrated to Marseilles in 1793, and made himself conspicuous as a hot-headed Republican by addressing clubs, and publishing

bombastic pamphlets. Shortly after, having been appointed to a situation in the commissariat at the small town of St. Maximin in Provence, he married the innkeeper's daughter. He made a narrow escape during the Reign of Terror, and in 1796 was appointed commissary at war, and on his election as a member of the Council of Five Hundred, took up his residence in Paris. He joined the opposition in the council, and seconded Sieyès and his party, who wished to frame a new constitution. He is said to have written to his brother in Egypt complaining of the incapacity of the executive Directory, and urging his return; and in 1799, when the council wished to outlaw Napoleon, Lucien, who was president, after manfully resisting the motion, slipped quietly out of the chair in the confusion, and sent in the soldiers, who cleared the hall. The revolution thus mainly accomplished by his decisive procedure led to the establishment of the consular government, and Lucien was a member of the commission which framed its constitution. Afterward appointed minister of the interior, he was active in the encouragement of education, art, and science, and organized the prefectures. As ambassador to Madrid (1800) he contrived to gain the confidence of King Charles IV. and his favorite, Godoy, and to undermine the British influence, which had until then been exercised at the court of Spain. On his return to Paris in 1802 he was member of the tribunate, and then a senator, and having lost his first wife, married a stockbroker's widow. This marriage, and other concurring causes, appear to have given deep offense to Napoleon, and in the enactment fixing the succession to the crown, while Joseph and Louis were named eventual heirs, Lucien and Jerome were not mentioned. The crowns of Italy and Spain were offered Lucien on condition of his divorcing his wife, but he refused them and chose a retired life, devoting himself to art and science. He fixed his residence at Rome, where he appears to have gained the good graces of Pius VII., who created him, in 1814, Prince of Canino. During Napoleon's haughty treatment of the Pope, Lucien had freely expressed his displeasure, and apparently despairing of a reconciliation with his brother, or perhaps not caring to ask it, he embarked for the United States in 1810, but had not proceeded far when he was captured by a British cruiser and carried to Malta. Ultimately he was brought to England, and allowed to reside on parole at a place in the vicinity of Ludlow Castle. Here he employed much of his time in writing a poem entitled '*Charlemagne ou l'église Sauvée*,' which he afterward published with a dedication to Pius VII. After the battle of Waterloo his brother appointed him his extraordinary commissioner to the chamber of deputies. He showed no lack of zeal in endeavoring to arouse a feeling of sympathy, but found the attempt vain, and left matters to take their course. He afterward returned to Italy. Besides the poem '*Charlemagne*,' which has been translated into English, and published in 2 volumes 4to, he wrote another, called '*La Cynéide ou la Corse Sauvée*,' and an autobiography, which, under the title of '*Mémoires*,' was published during his lifetime.

By his first wife, Lucien had two daughters; by his second, nine children. His eldest son, CHARLES LUCIEN JULES LAURENT BONAPARTE, Prince of Canino and Musignano: b. Paris, 24

BONAPARTE PRETENDERS — BONAPARTES OF BALTIMORE

May 1803; d. 29 July 1857, achieved a considerable reputation as a naturalist, chiefly in ornithology. He published a continuation of Wilson's 'Ornithology of America' (1825-33); the 'Iconografia della Fauna Italica' (1832-41); his *chef d'œuvre*; 'Catalogo Metodico degli Uccelli Europei' (1842); 'Catalogo Metodico dei Pesci Europei' (1845); 'Ornithologie Fossile' (1858); and a number of other valuable works on zoology, and was a member of the leading natural history societies in Europe and America. During the later years of his life he took a prominent part in Italian affairs as a supporter of the Liberal party. PAUL MARIE BONAPARTE, the second son, b. 1808, took a part in the Greek war of liberation, and died by the accidental discharge of a pistol in 1827. The third son, LOUIS LUCIEN BONAPARTE (b. Thorn Grove, England, 1813; d. 1891), early devoted himself with equal ardor to chemistry, mineralogy, and the study of languages, and became an authority of the first rank in Basque, Celtic, and comparative philology generally. His election for Corsica in 1848 was annulled, but he was sent to the Constituent Assembly for the Seine department next year, and was made senator in 1852, with the title of highness in addition to that of prince, which he already possessed from his birth. The total number of separate books written either by himself or at his instigation and encouragement, amounted to no less than 222. Among these are a translation of St. Matthew's version of the parable of the sower into 72 languages and dialects of Europe (1857); a linguistic map of the seven Basque provinces, showing the delimitation of the "Euscara," and its division into dialects, sub-dialects, and varieties (1863); a Basque version of the Bible in the Labourdin dialect (1865); a treatise on the Basque verb (1869); besides many papers of profound learning in the philological journals. A great work produced under his patronage from 1858 to 1860, was a version of the Song of Solomon in 22 different English dialects, besides four in Lowland Scotch, and one in Saxon. He lived long in England, where a Civil List pension of \$1,250 was granted to him in 1883. The fourth son, PIERRE NAPOLEON BONAPARTE (1815-83), passed through many changes of fortune in America, Italy, and Belgium, and returned to France in 1848. In 1870 he shot a journalist, Victor Noir, a deed which created great excitement in Paris; and, being tried, was acquitted of the charge of murder, but condemned to pay \$5,000 to Victor Noir's relatives. He died in 1881. The youngest son, ANTOINE BONAPARTE (b. 1816), fled to the United States after an affair with the papal troops in 1836, and returned to France in 1848, where he was elected to the National Assembly in 1849.

Bonaparte Pretenders. Of the Emperor Napoleon I. and his brothers, Joseph and Louis, male issue is now extinct. The emperor's brothers, Lucien and Jerome, are represented by the following living descendants, and they constitute the present imperialist house of France:

PRINCE VICTOR NAPOLEON (of the house of Jerome): b. 18 July 1862, is the son of the late Prince Napoleon and the Princess Clotilde, sister of King Humbert of Italy. The Prince has been recognized by his party as the undisputed head of the Bonaparte family. He lives in Brussels and is unmarried. His only brother,

Prince Louis Napoleon, born in 1864, is an officer in the Russian army. His sister, born in 1866, is the widow of Prince Amadeus of Italy, by whom she had a son, Prince Humbert, born in 1889.

PRINCE CHARLES NAPOLEON, brother of the late Cardinal Bonaparte, who died 12 Feb. 1899, was the last representative of the eldest son of Napoleon's brother, Lucien, in the male line. He was born in 1839; was married and had two daughters — Marie, wife of Lieut. Giotti, of the Italian army, and Eugénie, unmarried. He had three sisters, married, respectively, to the Marquis of Roccagivoino, Count Primoli, and Prince Gabrelli.

PRINCE ROLAND BONAPARTE is the only living male cousin of Prince Charles Napoleon. He is a son of the late Prince Pierre Napoleon Bonaparte (1815-81); was born in 1858; married in 1880, the daughter of Blanc, the proprietor of the Monte Carlo gambling establishment. His wife died in 1882, leaving him a daughter and a fortune. He has one sister, Jeanne, born in 1861, and married to the Marquis de Villeneuve.

Bonapartes of Baltimore, the branch of the family residing in Baltimore, Md., and derived from the marriage of Jerome Bonaparte, brother of the Emperor Napoleon I., with Elizabeth Patterson, daughter of William Patterson, an eminent merchant in the city of Baltimore. Elizabeth was born 6 Feb. 1785, and was scarce 18 years of age, when Jerome Bonaparte in command of a French frigate landed in New York in 1803. She, at that time, was distinguished by uncommon personal beauty, and is said, moreover, to have strikingly resembled the Bonaparte family. The fame of Napoleon insured for his brother Jerome a distinguished reception in America, and wherever he went he was most hospitably entertained. On visiting Baltimore he saw Miss Patterson, and soon became much attached to her, a partiality which she readily returned, and being ambitious in her views of life, she at once accepted his offer of marriage, and was united to him 24 Dec. 1803. The marriage ceremony was performed by the bishop of Baltimore, John Carroll, brother of Charles Carroll of Carrollton, the signer of the Declaration of Independence, and in accordance with the ritual of the Roman Catholic Church. The marriage contract, considered of importance, was drawn up by Alexander J. Dallas, subsequently secretary of the treasury, and witnessed by several official personages, including the mayor of Baltimore. Jerome Bonaparte remained in America for a full year, visiting, with his wife, various parts of the country. They embarked for Europe in the spring of 1805, in the American ship Erin, and arrived safely at Lisbon. The news of the marriage proved very distasteful to the dictator of France, partly because Jerome had dared to marry without his consent, and partly on account of his own wish to unite all his brothers to European princesses. Before the newly wedded pair could reach Europe, an order went forth to every port under French authority, forbidding them to land. The hopes of the fair American were now forever blighted, as Napoleon sternly refused to recognize her marriage. Jerome left her at Lisbon, and hastened to Paris, hoping by a personal interview to soften the emperor, directing the vessel to proceed to Amsterdam, as the state of his wife's health would

BONAR — BONBRIGHT

not admit of her undergoing a long land journey, even if a passport could be obtained for her, which was very doubtful. On the Erin's arrival at Texel roads, Madame Bonaparte found that an order had been awaiting her coming, which prohibited her from landing. She was obliged to sail at once for England, where she established her abode, and at Camberwell, near London, gave birth to a son. She never saw her husband again, except in a casual meeting many years after their separation. Jerome, who was originally much attached to his wife, in vain petitioned the emperor to recognize her, and was finally obliged to marry the Princess of Würtemberg. After the downfall of Napoleon, Madame Patterson (as she was styled for a long period) visited Europe, and is said to have encountered Jerome Bonaparte with his wife in the gallery of the Pitti palace in Florence. On meeting, Jerome started aside, and was overheard to say to the princess: "That lady is my former wife." He instantly left the gallery, and next morning departed from Florence. Napoleon I. never succeeded in inducing Pope Pius VII. to declare Jerome's first marriage null and void. Madame Bonaparte, after the birth of her son, generally resided in Baltimore, in the possession of abundant wealth. Notwithstanding her treatment by Napoleon, she always expressed the highest admiration for him, and prophesied that her grandson would eventually succeed him as emperor of the French. **JEROME NAPOLEON**, son of the preceding: b. Camberwell, England, 7 July 1805; d. Baltimore, 17 June 1870. His mother returned to the United States during his boyhood, and he was raised in Baltimore. He entered Harvard College, and graduated from that institution in 1826. He studied for the bar, but never practised law. He was married to Miss Susan Mary Williams, daughter of Benjamin Williams, originally of Roxbury, Mass. Miss Williams was a lady of very large fortune, which, united with Bonaparte's own property, made him one of the wealthiest citizens of Baltimore. After his marriage he devoted his time to the management of a large estate, and partly to agricultural pursuits. For many years, Bonaparte received a handsome allowance from his father, with whom he was on terms of intimacy in his several visits to Europe. During the reign of Louis Philippe, Bonaparte was permitted to sojourn in Paris, but for a short period only, and under his mother's name of Patterson. Although traveling *incognito*, he attracted much attention from his singular likeness to the great emperor. He was thought to resemble him more than any of the monarch's own brothers did. He was on good terms with Napoleon III., and visited the French court with his son, by the invitation of the emperor. Bonaparte tested his legal standing in the French courts by lodging a claim to share with the offspring of the second marriage, in the property of his father; but judgment was given against him. **JEROME NAPOLEON**, grandson of Jerome Bonaparte: b. Baltimore, 5 Nov. 1832; d. Pride's Crossing, Mass., 4 Sept. 1893. He was educated at Harvard College and West Point Military Academy, but resigned his commission in the United States army to enter the French service in 1854. He served with distinction in the Crimean war and in the Italian campaign. **CHARLES JOSEPH**, grandson of Jerome Bonaparte: b. Baltimore, 9 June 1851.

He was graduated from Harvard University in 1871 and the Harvard law school in 1874 and since then has practised his profession in his native city. He has been active in political reform movements.

Bonar, Horatius, Scotch hymnist: b. Edinburgh, 19 Dec. 1808; d. 31 July 1889. He wrote 'Hymns of Faith and Hope,' many of which have been taken into the hymnals of most of the Protestant churches. He also wrote more than 20 volumes on theological and religious subjects.

Bonasone, Giulio, jool'ē-ō bō-nā-sō'nā, Italian painter: b. Bologna, 1510; d. 1574. He studied under Marcantonio Raimondi, but did not equal his master in execution. Although best known by his engravings, which reproduce the works of Raphael, Michael Angelo, and Guilio Romano, specimens of his paintings are to be found in the churches of his native city.

Bonasus, a species of wild ox, the aurochs (q.v.).

Bonaven'ture, Saint (properly **JOHN OF FIDANZA**), Italian philosopher: b. Tuscany, 1221; d. 1274. In 1243 (or 1248) he became a Franciscan monk; in 1253 teacher of theology at Paris, where he had studied; in 1256, general of his order, which he ruled with a prudent mixture of gentleness and firmness. At the time of his death he was a cardinal and papal legate at the Council of Lyons. His death was hastened by his ascetic severities. On account of his blameless conduct from his earliest youth, and of some miracles ascribed to him, he enjoyed during his life the greatest veneration, and was canonized by Pope Sixtus IV. The elevation of thought in his writings procured him the name of "The Seraphic Doctor." The Franciscans oppose him as their hero to the Dominican scholastic Thomas Aquinas. He wrote for the honor and improvement of his order, for the promotion of the worship of the Virgin, on celibacy, transubstantiation, and other doctrines. He is, on the whole, distinguished from other scholastics by perspicuity, avoidance of useless subtleties, and greater warmth of religious feeling. Among his writings are 'Itinerarium Mentis in Deum'; 'Reductio Artium in Theologiam'; 'Centiloquium'; and 'Breviloquium.' His whole works were published 1588-96, at Rome, in 7 folio volumes, and there are several modern editions. Many pieces attributed to him are not genuine.

Bonavis'ta, Newfoundland, the name of a bay, cape, district, and town on the east coast of the island. The greatest width of the bay is 39 miles. Its navigation is rendered dangerous by the rocky islands with which it is studded. There is a lighthouse at the entrance of the harbor. The town stands near the cape, about 70 miles north by west of St. John's, and is a port of entry and fishing station. Pop. 3,551.

Bon'bright, Daniel, American educator: b. Youngstown, Pa., 1831. He graduated at Yale (1850), and was tutor there (1854-6). Between 1856 and 1858 he studied at the universities of Berlin, Bonn, and Göttingen, and upon his return to America became professor of the Latin language and literature in Northwestern University, Evanston, Ill. Since 1899 he has been dean of the faculty of liberal arts. During 1900-1 he was acting president of the university.

BONCHAMP — BOND

Bonchamp, Charles Melchoir Artus, shärl mël-kê-or är-tü bôn-shän (MARQUIS DE, mar-kê-dè), Vendean leader: b. Anjou, 10 May 1760; d. 17 Oct. 1793. He served as a volunteer in the American Revolutionary War, and was a captain in the French army at the outbreak of the French Revolution. A strong Royalist, he naturally disliked the Revolution, and consequently lived in retirement until chosen leader of the Anjou insurgents. In conjunction with La Rochejacquelein and Cathelineau he fought with great bravery and frequent success, but his superior knowledge of military tactics was not sufficiently made use of by the insurgent army. In the encounter at Cholet, 17 Oct. 1793, Bonchamp received a fatal shot in the breast, and when his followers vowed to revenge his death on 5,000 Republican prisoners, the dying hero exclaimed: "Spare your prisoners. I command it!" This last command was obeyed.

Bond, (Sir) Edward Augustus, English scholar: b. Hanwell, 1815. In 1867 he was placed over one of the departments of the British Museum, and in 1878 became head librarian, retaining the post for 10 years. He was one of the founders and for many years the president of the Paleogeological Society, editing in this connection 'Facsimiles of Ancient Manuscripts.' Among other works edited by him are 'Statutes of the Colleges of Oxford,' and 'Travels of Jerome Horsey.'

Bond, George Phillips, American astronomer (son of William Cranch Bond (q.v.): b. Dorchester, Mass., 20 May 1825; d. 17 Feb. 1865. He assisted his father in the Harvard College Observatory, and at the time of the latter's death was appointed director. He discovered independently 11 new comets, and was the author of an elaborate memoir on the appearance of Donati's comet in 1858, and of important investigations on the subject of perturbations of cometary orbits, as well as an investigation into the theory of the constitution of Saturn's rings. His drawing of the nebula in Orion, of which a fine steel-plate engraving was made, was also remarkable work, and astronomical photography received its first impulse at his hands.

Bond, William Cranch, American astronomer: b. Portland, Me., 9 Sept. 1789; d. 29 Jan. 1859. He began life as a watchmaker, and constructed the first ship's chronometer made in the United States. He established a private observatory at Dorchester, Mass., which was at the time the finest in the country. Invited to move his observatory to Cambridge, he accepted the invitation of the Harvard College authorities, and in 1840 was appointed astronomical observer to the college, and later to the directorship of the observatory erected there in 1843-4. He was the inventor of the method of registering the beats of a clock by galvanic circuit, together with the observed transits of stars over the wires of a transit instrument, upon a chronograph, and he invented the spring governor, in which part of a train of clockwork is regulated by a pendulum with a dead-beat escapement, and the other, receiving its motion through an elastic axis, is made to run uniformly by a balance- or fly-wheel, and thus time is visibly measured to a small fraction of a second. The plan of recording observations by electro-magnetism, known in Europe as the American method, was first

brought into practical working by Sears C. Walker, through Bond's assistance.

Bond. See BUILDING; MASONRY.

Bond, a written acknowledgment or binding of a debt under seal. The person who gives the bond is called the obligor, and he to whom it is given the obligee. A bond may be single, as where the obligor obliges himself, his heirs, executors, and administrators, to pay a certain sum of money to another at a day named, or it may be conditional (which is the kind more generally used) that if the obligor does some particular act, the obligation shall be void, or else shall remain in full force, as payment of rent, performance of covenants in a deed, or repayment of a principal sum of money borrowed of the obligee with interest, which principal sum is usually half of the penal sum specified in the bond. There must be proper parties, and no person can take the benefit of a bond, except the parties named therein, except, perhaps, in some cases of bonds given for the performance of their duties by certain classes of public officers. A man cannot be bound to himself even in connection with others. The bond must be in writing and sealed, but a sealing sufficient where the bond is made is held sufficient though it might be an insufficient sealing if it had been made where it is sued on. It must be delivered by the party whose bond it is to the other. But the delivery and acceptance may be by attorney. The date is not considered of the substance of a bond, and therefore a bond which has either no date or an impossible date is still valid, provided the real day of its being dated or given can be proven. The condition is a vital part of a conditional bond, and usually limits and determines the amount to be paid in case of a breach, but interest and costs may be added (12 Johns. 350). The recovery against a surety in a bond for the payment of money is not limited to the penalty, but may exceed so far as necessary to include interest from the time of the breach. So far as interest is payable by the terms of the contract, and until default made, it is limited by the penalty, but after breach it is recoverable, not on the ground of contract, but as damages, which the law gives for its violation. On the forfeiture of the bond, or its becoming single, the whole penalty was formerly recoverable at law, but here the courts of equity interfered, and would not permit a man to take more than in conscience he ought, that is, his principal, interest and expenses in case the forfeiture accrued by non-payment of money borrowed, the damages sustained upon non-performance of covenants, etc. And the similar practice having gained some footing in the courts of law, the statute of 4 and 5 Anne, C. 16, at length enacted, in the same spirit of equity, that in case of a bond conditioned for the payment of money, the payment or tender of the principal sum due with interest and costs, even though the bond were forfeited and a suit commenced thereon, should be a full satisfaction and discharge. (2 Bl. Com. 340.) If in a bond the obligor binds himself without adding his heirs, executors, and administrators, the executors and administrators are bound, but not the heir (Sheppard's Touchstone, 369) for the law will not imply the obligation upon the heir. (Coke,

BONDAGE—BONE

Litt. 209a.) If a bond lie dormant for 20 years it cannot afterward be recovered; for the law raises a presumption of its having been paid, and the defendant may plead *solvit ad diem* to an action upon it. (1 Burr. 434; 4 Burr. 1963.)

Bondage. See VILLENAGE.

Bonded Warehouse, a place where taxable imports of manufactures may be left in government custody, under bond for payment of the duty, till the importer or manufacturer is prepared to make full payment of duty. The system was designed to promote commerce and certain manufactures by lessening the pressure on the importer or manufacturer by means of instalment payments of duty.

Bonders, a class of independent landholders in Norway and Sweden. They are at once peasants and aristocrats, being descended from the old leaders, and sometimes from the princes, of the nation, yet being also cultivators of the soil, and more rude than the farmers of America or the yeomen of England. They number seven ninths of the whole population, and are the principal electors of representatives to the National Assembly, in which their power predominates over that of the nobles and clergy.

Bondi, bön'dē, Clement, Italian poet: b. Mizzano, Parma, 27 June 1742; d. Vienna, 20 June 1821. Joining the Jesuits shortly before the suppression of the order in Italy, he was appointed professor of eloquence in the University of Parma. He afterward provoked the hostility of the order by publishing an ode in praise of their suppression, and was obliged to seek an asylum in the Tyrol, where the Archduke Ferdinand took him under his protection, appointed him his librarian at Brunn, and entrusted him with the education of his sons, one of whom afterward succeeded to the duchy of Modena. In 1816 Bondi was appointed professor of history and literature at Vienna, and died there. He was an easy and elegant versifier, and cultivated with success almost all the varieties of poetry—lyric, didactic, satirical, and elegiac. Among the most important are 'La Giornata Villereccia,' 'La Conversazione,' and 'La Felicità.' He also executed a metrical version of the Æneid, which some consider his best work.

Bondman, The, one of Hall Caine's best-known romances, abounding in action and variety. The action turns upon the blind attempts of a young man at doing new wrongs to revenge old ones, which are overruled by Providence for good; and at the last, no longer against his will but by the development of his own nature, he fulfills his destiny of blessing those he has sworn to undo.

Bondu, bön-doo, a country of West Africa, belonging to the French territory of Senegal, on the west of the Falémé, a tributary of that river. Its length is about 115 miles, its breadth about 100. Its surface is but little diversified, and the land as a whole is not very fertile, nor is the climate good. The ordinary African animals occur, but the lion is becoming scarce. The ass is the chief domestic animal. The population, which consists of Fulahs and other tribes, is rather sparse, having been reduced by

frequent wars, but under French rule is beginning to increase. Agriculture, manufactures, and commerce are alike unimportant.

Bone, or Bona (the APHRODISIUM of Ptolemy), a seaport of Algeria, province of and 86 miles north-northeast of Constantine. Pop. (1896) 34,498, among whom there are about 12,000 French and 10,000 Italians. It is built at the foot of a hill, and is surrounded by a wall nearly two miles in circumference. It is the seat of French judicial courts. The streets are narrow and crooked, but many of the houses are substantial and well built, and the town has been greatly improved since it came into the hands of the French in 1832. It possesses a college, schools, Roman Catholic cathedral, a convent of the Sisters of Mercy, hospital, etc. There is a good market, and also reading-rooms, coffee-houses, and a theatre. The chief manufactures are burnouses, tapestry, and saddles. It exports corn, iron ore,alfa, wine, wool, hides, wax, oil, honey, etc.; and its trade is considerable. There is regular steamboat communication between Bona and Marseilles. About one mile south of the town are the remains of Hippo Regius.

Bone, the compact hard material making up the skeleton of mammals, most of the birds, reptiles, and amphibians, and the bony fishes. It is also found in some lower forms. Chemically bone is complex. It is essentially organic substances, 30 to 35 per cent infiltrated with inorganic mineral salts, 65 to 70 per cent; to the former its toughness is due and to the latter its hardness. The organic substances of bone are ossein (collagen) (gelatin), small quantities of elastin, proteids and nuclein from the cells and small quantities of fat. The inorganic salts are calcium carbonate, calcium phosphate, calcium fluoride, magnesium phosphate, calcium chloride, and small quantities of sulphates and other chlorides. The percentages of both inorganic and organic constituents vary widely in the bones of different animals, and also in the different bones of the same animal. These differences vary widely if the age varies, but are fairly constant for the same animal of the same age. Thus the amount of water may vary from 13 to 45 per cent in the different bones of the human body, being greater in amount in the spongy bones and less in the compact bones, and as the bones grow older the percentage of water diminishes. In the living body many of the bones, particularly the ribs, and the heads of all the long bones, contain a substance termed marrow. This is an important substance in the human economy, being the source of much of the blood-building material. In soups this marrow makes one of the most important factors. This bone marrow is pervaded by a network of white fibrous connective tissue and in the meshes are contained the cells, myeloplaxes, that make many of the blood corpuscles, particularly the polymorph neutrophiles, and the eosinophiles. In the red marrow the red corpuscles are developed. The bone marrow is very rich in proteids, nucleo-proteids, extractives, globulins, fats, and compounds of iron. Prepared bone marrows are therefore highly nutritious, and the modern "grilled bone," which is usually rich in marrow, is a toothsome and valuable dietary addition. The histological structure of bone is very intricate;

BONE BLACK

in the young developing animal, cartilage first makes its appearance from modified connective tissue cells. In this cartilage certain points of ossification appear, which subsequently develop bone and the bone from several points coalesces to make the completed bone structure. The bone cells in the cartilage, the osteoblasts, thicken and form a distinct cell wall in which the inorganic salts are deposited and osteoblast by osteoblast the structure of bone is made up. Bone is also formed by the periosteum, which is a covering, first of the cartilage and then of the developing bone. Bony tissue contains arteries, veins, nerves, and lymphatics, and is a distinct tissue, largely modified by the deposition of mineral salts. In a section across a long bone, at its centre, say the thigh bone, femur, there is on the outside the thin tough layer, the periosteum with its vessels and nerves and lymphatics; within this is the compact bone and in the centre the cavity usually filled with marrow at the ends. A very thin section of the compact bone viewed under the microscope shows a number of cavities, the Haversian canals; these contain blood vessels or were the sites of former blood vessels in the developmental stage. Around these Haversian canals, one sees regular lamellæ, not unlike the rings about a tree trunk; these are the Haversian lamellæ and indicate the regular growth of bone cells from the centre. Scattered between the lamellæ are numerous small spaces, containing living bone cells, the lacunæ, all of which are probably in communication with one another by minute canals, or canaliculi. Thus the entire bony system is pierced throughout by an extremely fine and exceedingly rich network of canals. As these are filled with lymph the bone substance is constantly bathed in this living life-giving fluid. The different bones of the body show minor variations in structure. The bones of the human body are grouped according to their shape, as long bones, flat bones, short, and irregular bones. They approach one another at the joints, where they are protected by cartilages, smooth synovial membrane, and bathed in a synovial fluid. The long bones consist of a shaft and two expanded ends or epiphyses, and are found in the limbs. They give support and leverage for motion and are usually slightly curved in one or two directions to give greater elasticity. Flat bones are found in the skull, pelvis, scapula, and are usually so disposed as to afford protection to the internal viscera; they also offer considerable surface for muscular attachment and hence give a good leverage for the long bones. Short bones are found in the wrist and ankle. Strength and freedom of motion are their attributes. Irregular and mixed bones, are the vertebræ and some of the bones of the skull. They each have varied and specially adaptive functions. Many bones, especially those of the skull, are composite. They develop separately, and finally unite. Thus the bones of the skull are separated until late in life, and in some individuals, some of the bones never develop thoroughly. This is frequently the case in the growth of the lower jaw, where failure to unite produces the well-known deformity of cleft palate or hare lip.

Bone is slightly heavier than water, its specific gravity varying from 1.80 to 1.90. The spongy bones, because of the large amount of

air contained, float in water. The bones of birds are remarkable for their strength and lightness. The twofold nature of bones is readily demonstrated by two simple experiments. If one bone is placed in acid, 20 per cent hydrochloric, the acid will attack and dissolve out the mineral salts, after which the bone may be bent and its shape altered at pleasure, nothing but the organic material remains; another similar bone may be placed in a furnace and the heat will burn out the organic matter entirely; that which remains will be the mineral matter. It will retain the shape of the original bone, will be white, but will break down into powder at the least pressure.

Uses of the Bones.—In dietetics bones make a substratum for soups. These are important carriers of salts to the body. As for the gelatine alone, it is a tissue sparer, the body can not use it for purposes of anabolism, but it spares katabolism of proteids. It is a useful menstruum for foodstuffs. Bone marrow is highly nutritious, contains iron, and is a superlative food, and thought to be particularly valuable as a blood maker. The uses of bone in the arts are numerous. (See FERTILIZERS.) Consult Syminowitch, 'Histology'; Gray, 'Anatomy.' See KINETOGENESIS.

Bone Black, Ivory Black, or Animal Charcoal, the black carbonaceous substance into which bones are converted by calcination or destructive distillation in close vessels, and which is extensively used in the process of sugar-refining. This application of it is due to the property which it possesses in common with other kinds of charcoal, but in a superior degree, of depriving various kinds of solutions, syrups, etc., of their coloring matters, and thus blanching or purifying them. Animal charcoal is prepared either by heating the bones in a retort similar to that in which the coal is decomposed in gas-works, or, which is the better plan, in small cast-iron pots piled up in a kiln. The pots are placed above each other with their mouths in contact, the mouths being luted together with loam. Two of the pots together hold about 50 pounds of bones, which should previously be freed of all fatty, fleshy, and tendinous matters, as the quality of the charcoal is in this case improved. The bones lose, on the average, about half their weight in the process of calcination. The charcoal is ground between grooved rollers in order to prevent the formation of dust, and by this means it is reduced to the condition of coarse grains varying from the size of turnip-seed to that of peas. Liquids are decolorized by passing them through a filter or bed of thin granular charcoal, which absorbs by mechanical action the coloring matters held in solution. The filtering beds used in sugar-refining are sometimes of the depth of 50 feet. After the liquor has flowed for a certain time the charcoal becomes completely saturated, and its purifying action ceases. It has then to be restored so that it may be used again, and this is effected by various means, such as washing with water or with weak hydrochloric acid, long exposure to air and moisture, or heating to redness. The last is the best method, and is the one almost invariably adopted, the charcoal being heated in iron pipes, fire-clay chambers, or in rotating cylinders. See CHARCOAL, ANIMAL.

BONE-CAVES — BONHAM

Bone-caves, caverns containing deposits in which are embedded large quantities of the bones of animals (many of them extinct), dating from the Pleiocene or later geologic periods. See CAVE.

Bone Diseases. See OSTEOMYELITIS; PERIOSTITIS; OSTEITIS.

Bone-dog. See BONE-SHARK; DOGFISH.

Bone-dust, bones ground to dust to be used as manure. See FERTILIZERS.

Bone-fish. See LADY-FISH.

Bone-shark, or **Basking-shark**, a comparatively rare species of pelagic shark, found in the Arctic seas, and southward as far as Portugal and New York. It obtains the name "bone-shark" from the resemblance of its slender, long and close-set gill-rakers to whale-bone. It is also known as "basking-shark," because of its habit of remaining quiet for hours in one place. It reaches a length of 40 feet, and its skin is rough and covered with small spikes. It is usually seen in the brooding season, sluggishly swimming in groups, on the surface of the water, and undisturbed by the approach of boats.

Bonebreaker, the great fulmar petrel (*Ossifraga gigantea*) of the islands and coasts of the South Pacific and Atlantic oceans. It is as large as an albatross, and feeds mainly upon the carcasses of dead seals and cetaceans, whose bones it is capable of breaking with its vulture-like beak. See FULMAR PETREL.

Boner, John Henry, American poet and literary worker: b. Salem, N. C., 31 Jan. 1845. A contributor to the magazines, he was on the editorial staff of the 'Century Dictionary' and the 'Standard Dictionary,' and was at one period literary editor of the New York *World*. He has written 'Whispering Pines' (1883), a volume of verse.

Boner, Ulrich, ool'rih bō'nēr, the most ancient German fabulist, a Dominican friar at Bern, in the first half of the 14th century. His collection of fables under the title 'Der Edelstein' (the Gem), is distinguished by purity of language and picturesque simplicity of description. The first editions of these fables were by Bodmer and Eschenburg. Benecke published a very good edition with explanatory notes and an excellent vocabulary (1816); that of Pfeiffer appeared in 1844, and a recent imprint is found in Reclam's 'Universal Bibliothek' (1895).

Boneset, or **Thoroughwort** (*Eupatorium perfoliatum*), a stout, ill-smelling perennial herb of the natural order *Compositae*, native of America, common in moist soil. The plants, which attain a height of sometimes eight feet, are often planted as ornamentals in low ground. In midsummer when the profusion of purplish or white flowers are in full blow they are striking objects. The foliage and flowers have been used as a tonic in domestic medicine, their intensely bitter taste being supposed to commend them for this purpose. See EUPATORIUM.

Bonet, Juan Pablo, hoo-an' pāb'lō bō-nēt', Spanish teacher of the deaf and dumb of the 17th century, distinguished as one of the first teachers of this class, and the author of a remarkable work 'Reduccion de las letras y artes para enseñar a hablar a los mudos,' published

in Madrid, 1620. It explained his method of instruction, containing the first alphabet for the deaf and dumb, and was of good service to Dalgarno, Wallis, and, a century later, to the Abbé de l'Epée, who acknowledged his indebtedness to Bonet's labors.

Bonfiglio, or **Buonfiglio**, **Benedetto**, bā-nā-dēt'tō bōn-fē'lyō, Italian painter: b. 1425 (?); d. 1490 (?). His chief work was the frescoes of the Palazzo Comunale at Perugia, where he lived. These frescoes placed him in the first rank of the painters of the Umbrian school. It is believed that he also assisted Pinturicchio in decorating the Vatican.

Bong'abong, Philippines, a town in the southeast part of Luzon, with an estimated population of 20,000. It lies in a mountainous district, and attained military importance as the headquarters of a regiment of United States troops. The town has a municipal government based upon popular election.

Bongar, bōn'gār, a serpent of the genus *Bungarus*. See KRAIT.

Bonghi, Ruggero, rood-jā'rō bōn'ge, Italian scholar and publicist: b. Naples, 21 March 1826; d. near Naples, 22 Oct. 1895. The commencement of his brilliant career indicated scholarly activities only, for he made fine studies and versions of Aristotle and Plato; but latterly he took up such subjects as 'The Financial History of Italy, 1864-8' (1868); 'The Life and Times of Valentino Pasini' (1807), and 'The Life of Jesus' (1890); 'The Roman Festivals' (1891); the popularity and value of these and other works giving him great prominence. He held professorships in several Italian universities; was minister of public instruction in 1874-6; was a member of the Chamber of Deputies nearly continuously from 1860; founded the *Stampa*, the leading Turin journal, and the magazine 'Cultura,' of which he was editor at the time of his death; and presided over the International Peace Congress held in Rome in 1891.

Bon'go, or **Obongo**, the name of a negroid people in the basin of the Ogowe River, in the French Congo. They live by the chase, grazing, and agriculture, and are skilful workers in iron.

Bongo, a large west African bushbuck (q.v.).

Bonham, Milledge L., American lawyer and soldier: b. Edgefield, S. C., 25 Dec 1813; d. White Sulphur Springs, N. C., 27 Aug. 1890. He graduated at South Carolina College, 1834, was admitted to the bar, 1837, and served as a representative in Congress 1840-4. In 1836 he was major and adjutant-general of the South Carolina Brigade in the Seminole war in Florida; and colonel of the 12th U. S. Infantry during the Mexican war. In 1856 he was elected to Congress as a State Rights Democrat, and re-elected in 1858, but left Congress 21 Dec. 1860, when the South Carolina delegation withdrew. Commissioned a brigadier in the Confederate army, 19 April 1861; he commanded Beauregard's centre at the first battle of Manassas, but gave up his commission to enter the Confederate Congress, 27 Jan. 1862. He was governor of South Carolina 1862-4, when he was again commissioned a brigadier-general, and was serving with Gen. Johnston

BONHAM — BONHOMME RICHARD

at the time of the latter's surrender. In 1868 he was a delegate to the National Democratic convention in New York.

Bonham, Texas, a town and county-seat of Trannin County, situated on the Texas & P. and the Denison, B. & N. O. R.R.'s. It is the seat of Carlton College, and the Masonic Female Institute. As the centre of an agricultural region it has a large export trade, especially in cotton. Its chief manufacturing industries are flour mills, cotton-gins, machine-shops, carriage and wagon factories, tobacco factories, etc. Pop. (1900) 5,042.

Bonheur, François Auguste, frän-swa â-güst bō-ner, French painter, brother of Rosa Bonheur: b. Bordeaux, 4 Nov. 1824; d. 23 Feb. 1884. The beauty of his landscapes has been much praised. He was made Chevalier of the Legion of Honor in 1867 and received numerous medals.

Bonheur, Jules Isadore, zhül ez-a-dôr bō-nēr, French painter and sculptor, brother of Rosa Bonheur (q.v.): b. Bordeaux, 15 May 1827. In the Salon of 1848 he exhibited both paintings and sculpture but in later years confined himself to sculpture. Medals were awarded him in 1865 and 1867. Among noted works of his are 'The Zebra and Panther'; and 'The Tiger Hunter.'

Bonheur, Marie-Rosa, mā-re rō'za bō-nēr, French artist of distinction, widely known as a painter of animals: b. Bordeaux, 22 March 1822; d. Fontainebleau, 25 May 1899. She received her earliest instruction in art from her father, and when only 18 years old exhibited two pictures, 'Goats and Sheep,' and 'Two Rabbits,' which gave clear indications of talent. In 1849 a fine work, 'Labourages Nivernais,' by her, was purchased by the French government for 3,000 francs and placed in the Luxembourg collection. In 1855 'The Haymaking Season in Auvergne' was hung at the Universal Exposition in Paris, and in the same year she sent the 'Horse Fair' to the French Exhibition in London, where it was the centre of attraction for the season. It was offered by her to Bordeaux for \$6,000, but the offer being declined it was sold in England for \$20,000. It was subsequently purchased by Cornelius Vanderbilt for the Metropolitan Museum in New York. She made a quarter size replica which is now in the National Gallery in London. After this work she stood at the very head of delineators of animal life, showing a wonderful power of representing spirited action. Near her studio she had an ante-chamber as a stable for the convenient study of animals, of which she collected some noble specimens. She also attended horse markets and fairs; generally wearing masculine dress, which was not unbecoming to her strong and marked features. After 1849 she directed the Free School of Design for Young Girls in Paris. During the siege of Paris the crown prince of Prussia especially ordered that her studio and residence at Fontainebleau should be spared and respected. She received a first-class medal at the French Salon in 1849, and another in 1855; and the decoration of the Legion of Honor in 1865; was made a member of the Institute of Antwerp in 1868; received the Leopold cross from the king of Belgium in 1880, and the same year received from the king of Spain the Com-

mander's Cross of the Royal Order of Isabella the Catholic. In 1892 a celebrated painting by her, entitled 'Horses Threshing Corn,' was sold for \$60,000. It is the largest animal picture ever painted, showing 10 horses large as life. In 1896, on her 74th birthday, she furnished a painting representing the historical combat between two stallions to which Lord Godolphin invited his friends in 1734. See Larnelle, 'Rosa Bonheur, sa vie et ses œuvres' (1885); Peyrol, 'Rosa Bonheur: Her Life and Works'; Stranahan, 'A History of French Painting' (1899).

Bonhomme, Jacques, zhāk bō-nōm, a term of contempt used by the French nobility to designate the common people, especially the peasants.

Bonhomme Richard, the flagship of John Paul Jones (q.v.), in the most remarkable naval victory on record, 23 Sept. 1779; originally the Duras, a worn-out unseaworthy merchant Indian assigned to him by the French government because none of their own naval officers would serve under a foreigner, and renamed by Jones from Franklin's 'Poor Richard,' because he obtained her by following one of its maxims. She had 21 guns on a side, mainly 12-pounders, with three 18-pounders aft near the water line; and a mongrel crew of Americans, British, Portuguese, and other classes. With three other vessels in the squadron Jones intercepted, off Flamborough Head, on the east coast of England, a British fleet of naval stores from the Baltic, convoyed by the Serapis (Capt. Richard Pearson) and the Countess of Scarborough. The latter was captured by one of Jones' squadron; the former about 7 o'clock on a moonlight night joined battle with the Richard, having 25 guns on a side, 10 18-pounders—a much greater weight of metal than its foe, and with far more penetrating power than the 12-pounders of the American ship. To neutralize this advantage Jones' policy was to fight at close range; and in the attempt to rake the Serapis the two vessels swung broadside to and were lashed together by Jones, and fought the rest of the battle so close that the guns could not be run out full length, their muzzles touched, and the rammers of each had to be thrust into the port-holes of the other to load. Only those of the starboard side of each could be used. Two of Jones' 18-pounders burst at the first fire; his lighter guns were gradually silenced by the Serapis; the entire sides of his vessel were shot away, so that the Serapis' shot passed through without touching anything; she caught fire in several places; she had been leaking at the outset, and now had several feet of water in the hold; and an under-officer in affright let the 200 or 300 British prisoners loose and ran to tear down the colors, but finding the flag-pole gone began to shriek for quarter. Lieut. Dale with immense presence of mind set the prisoners at the pumps, not only saving a guard but releasing the pumpmen to fight; Jones broke the officer's head with a pistol-butt, and in answer to Pearson's inquiry if he was ready to surrender, replied, "I have not begun to fight yet," though the Serapis was firing heavily and his own guns were nearly still. Meantime, however, the deadly musket fire from the Richard's top gear had made the service of the upper guns of the Serapis almost sure death, and they too were silenced; a cannon-shot

BONI — BONIFACE

brought down her mainmast; the combustibles thrown from the Richard wrapped her upper deck in fire; at last a bucket of hand-grenades flung down her hatchways set off a mass of cartridges strewn along the decks, killing or wounding nearly all those around, and wrecking five guns; and just then Jones' ship, the *Alliance*—whose timid, half-insane French captain had been tacking about, occasionally firing grape-shot at random into both vessels, came near, and Pearson struck his colors, though four of his guns were still firing and his ship was sound. Jones put Dale aboard the *Serapis*, and tried to navigate the Richard to a friendly port; but at 9 o'clock of the 25th she had to be abandoned, and she sank about an hour later.

Boni, bō'ne, a district in the island of Celebes, and one of the principal states of the Bugis nation, with an estimated area of about 1,000 square miles. This territory is mountainous, but, though contiguous to the great volcanic belt of the archipelago, exhibits no traces of volcanic action. Lompoo-Batang (great pillar), its highest peak, and the loftiest in Celebes, attains an elevation of 8,200 feet above the level of the sea. Lake Labaya, or, as called by the natives, Taparang-Danau, in the northwest corner of this territory, is a beautiful sheet of water, 24 miles long and 13 broad, with an average depth of six fathoms, and abounds in fish. It is bordered on all sides by a luxuriant and richly diversified tropical growth, except at the mouths of the numerous little streams that empty into it, where clearings, and beautiful, picturesque little villages, attest the industry, skill, and civilized tastes of the Bugis people. Boni was formerly the most powerful state in Celebes, but since 1859 has been practically a Dutch dependency. In the north the scenery is fine, and the soil fertile—rice, sago, and cassia being produced. The inhabitants have an allied language to the Macassars, with a literature of their own. Their towns and villages dot the coast, and as enterprising merchants and sailors the Bugis are found in every port of the East Indian Archipelago; they also engage in agriculture and in the manufacture of cotton and articles of gold and iron, in which they have a large trade. They are well built, active, and brave, and are lighter skinned, as well as superior in honesty and morality to other Malay races. Their institutions, said to be very ancient, partake of the character of a constitutional monarchy. The British have twice attacked the Bonese for injuring their commerce, and selling the crews of British ships into slavery. In the second attack, in 1814, the Bonese king was killed. The number of the population is unknown, being variously estimated from 200,000 to 300,000. The capital, called Boni, stands on the coast of the southwest peninsula. The Gulf of Boni separates the southeast and southwest peninsulas of Celebes. It is 200 miles long, and 40 to 80 miles broad.

Boniface, Saint, the apostle of Germany, who first preached Christianity and spread civilization among the Germans: b. Crediton, England, 680; d. Dokkum, West Friesland, 5 June 755. His original name was Winfrid. In his 30th year he was consecrated a priest. A great part of Europe at this period was inhabited by heathen peoples, and several missionaries set

out from England and Ireland to convert them. Among these was Boniface, who in 718 went to Rome, where Gregory II. authorized him to preach the gospel to the nations of Germany. He commenced his labors in Thuringia and Bavaria, passed three years in Friesland, and journeyed through Hesse in Saxony, baptizing everywhere, and converting the pagan temples to Christian churches. In 723 he was invited to Rome, made a bishop by Gregory II., and recommended to Charles Martel and all princes and bishops. His name Winfrid he changed to Boniface. He destroyed the oak sacred to Thor, near Geismar, in Hesse, founded churches and monasteries, invited from England priests, monks, and nuns, and sent them to Saxony, Friesland, and Bavaria. In 732 Gregory III. made him archbishop and primate of all Germany, and authorized him to establish bishoprics, the only existing bishopric being the one at Passau. He founded those of Freising, Ratisbon, Erfurt, Baraburg (transferred afterward to Paderborn), Würzburg, and Eichstadt. In 739 he restored the episcopal see of St. Rupert, at Salzburg. After the death of Charles Martel he consecrated Pepin the Short, king of the Franks, in Soissons, by whom he was named Archbishop of Mainz. He held eight ecclesiastical councils in Germany, founded the famous abbey of Fulda, and undertook in 754 new journeys for the conversion of the infidels. In Fulda a copy of the gospels, in his own handwriting, is to be seen, and there is a statue to him also. At the place where Boniface built, in 724, the first Christian church in North Germany, near the village of Altenburg, in the Thuringian forest, a monument has been erected to his memory. The most complete collection of the letters of Boniface was published at Mainz, 1789, folio; and of his entire works, 2 volumes, Oxford, 1845. See *Lives by Cox* (1853); *Werner* (1875); *Fischer* (1880); *Ebrard* (1882).

Boniface, the name of several Popes. **BONIFACE I.**, elected 418 by a party of the clergy, and confirmed by the Emperor Honorius, who declared the anti-pope Eulalius a usurper. Boniface condemned Pelagianism, and extended his authority by prudent measures. In a contest with the Emperor Theodosius, who endeavored to take from the bishops of Thessalonica their canonical jurisdiction over Illyria, he successfully vindicated the primacy of the Roman See. **BONIFACE II.**, elected 530; d. 532. The death of his rival, the anti-pope Dioscorus, a few days after his election, left him in quiet possession of the papal chair. During his pontificate St. Benedict laid the foundations of monasticism in the West. **BONIFACE III.**, chosen 607, died nine months after his election. **BONIFACE IV.** reigned 608-615. He consecrated the Pantheon to the Virgin and all the saints. **BONIFACE V.**, a Neapolitan, was Pope 619-625. He confirmed the inviolability of the asylums, and endeavored to diffuse Christianity among the English. **BONIFACE VI.**, a Roman, elected 896, died a fortnight after. **BONIFACE VII.**, anti-pope, elected 974 during the lifetime of Benedict VI., whose death he was suspected of having caused. Expelled from Rome he returned on the death of Benedict VII., and found the chair occupied by John XIV., whom he deposed and threw into prison, where he died. Boniface died 11 months after his return. **BONIFACE VIII.**,

Benedict Gaetano: b. Anagni of an ancient Catalonian family; elected Pope 24 Dec. 1294. He studied jurisprudence, was a canon at Paris and Lyons, advocate of the consistory, and prothonotary of the Pope at Rome. After Martin IV. had elevated him to the dignity of a cardinal (1281) he went as legate to Sicily and Portugal, and was intrusted with the charge of reconciling the king of Sicily with Alphonso of Aragon, and Philip the Fair with Edward I. of England. After Coelestine V. had resigned the papal dignity at Naples, in 1294, at the instigation of Boniface, the latter was chosen Pope. He met with opposition from the cardinals of the family Colonna, whose antagonism followed him throughout his entire pontificate. His induction was magnificent. The kings of Hungary and Sicily held his bridle on his way to the Lateran, and served him at table with their crowns on their heads. Boniface, however, was not successful in his first efforts for the increase of his power. He first opposed Albert of Austria in his contest for the imperial title, but finally yielded and crowned him emperor. He was equally unsuccessful in his attempt to arbitrate between England and France. The bulls which he issued at this time against King Philip the Fair of France obtained no consideration. This was also the case with the interdict which he pronounced against him at the Council of Rome in 1302. Intimidating the clergy in France, Philip refused to yield to the Pope's decrees. The Pope was accused of duplicity, of simony, of usurpation, of heresy, of unchastity; and it was resolved to condemn and depose him at a general council at Lyons. Philip went still further; he sent Nogaret to Italy in order to seize his person and bring him to Lyons. Nogaret united himself for this purpose with Sciarra Colonna, who with his whole family were bitterly inimical to Boniface. Boniface fled to Anagni, where Nogaret and Colonna surprised him. Boniface acted with spirit. "Since I am betrayed," said he, "as Jesus Christ was betrayed, I will die at least as a Pope." He assumed the pontifical robes and the tiara, took the keys and the cross in his hand, and seated himself in the papal chair. But the insignia of his holy office did not save him from seizure. Nay, Colonna went so far as to use personal violence. Boniface remained in imprisonment for two days, when the Anagnese took up arms and delivered him. After this he departed to Rome, where he died, a month later, in 1303.

BONIFACE IX., Pietro Tomacelli of Naples, succeeded Urban VI. at Rome during the schism in the Church, while Clement VII. resided in Avignon. He was distinguished for the beauty of his person and the elegance of his manners, rather than for a profound knowledge of theology and canon law. Even the counsel of his experienced cardinals could not save him from the commission of gross blunders. He made the annates a regular tax in 1392. Many abuses in the sale of benefices were indulged during his pontificate. A notable event in his reign was the suppression of the rebellion in Rome in favor of a Republic. He supported the pretensions of Ladislaus to the throne of Naples, and during the greatest part of his pontificate was engaged in negotiations at Avignon with his rivals, Clement VII. and Benedict XIII. He died 1404.

Bonifacio, Veneziano, vā-nād-zē-ā'nō bō-ne-fā'chō, Italian painter: b. Venice, about 1525; d. about 1579. He belonged to the Venetian school and his 'Saint Jerome and Saint Margaret'; 'Saint Barnabas and Saint Sylvester'; 'Saint Anthony and Saint Mark' are still in the Venice Academy.

Bonifacio, bō-ne-fā'chō, **Strait of,** the Fretum Gallicum of the Romans, lies between Corsica and Sardinia, and at the narrowest part is only seven miles wide. The navigation is difficult owing to the rapid current and the great number of rocks, which, however, are favorable to the production of coral.

Bonifazio Veronese, bō-ne-fā'tse-o vā-rō-nā'sā (THE ELDER), Italian painter: b. Verona, 1490; d. 1540. He was a notable colorist of the Venetian school and many of his works have been attributed to Titian and to Giorgione, whose styles he imitated. Among known works of his are 'The Finding of Moses' in the Dresden Gallery, and 'Dives and Lazarus' in the Venice Academy.

Bonin (bō-nēn') **Islands,** several groups of islands, North Pacific Ocean, extending from lat. 27° 44' 30" to 26° 30' N., south of and belonging to Japan. The northwest island of the most northern cluster, called Parry Group, is in lat. 27° 43' 30" N.; lon. 142° 8' E.; the cluster consists of small isles. The largest of the chain is Peel Island, on the west side of which is a good harbor called Port Lloyd, in lat. 27° 5' 30" N.; lon. 142° 11' 30" E., nearly surrounded by hills crowned with palm trees. Almost every valley has a stream of water. Green turtle abound in the sandy bays. Sharks are numerous, and fish of several kinds plentiful. Peel Island is inhabited by some English, Americans, and Hawaiians, who cultivate maize, vegetables, tobacco, and the sugar-cane. It is frequently visited by vessels in want of water and fresh provisions. The islands were discovered by the Japanese in 1593 and since 1876 have been in the possession of Japan. Pop. about 1,400.

Bon'ington, or Bonnington, Richard Parkes, English painter: b. 25 Oct. 1801, at Arnold, a village near Nottingham, where his father was a painter and lace manufacturer; d. London, 23 Sept. 1828. When Richard was in his boyhood the family removed to Calais and afterward to Paris. He early displayed a decided predilection for art, and entered as a student at the Louvre, and was also for a time in the studio of Baron Gros. His genius displayed itself in landscape-painting, and he rapidly rose to great eminence in this department, first in Paris and afterward in England, to whose Royal Academy Exhibition he contributed several pictures which created a great sensation. He worked at first entirely in water-color, but from about 1825 he also used oil. A brilliant career was in prospect for him, when he was cut off by pulmonary consumption. See Muther, 'History of Modern Painting' (1896).

Bonito, bō-nē'tō, a fish of the mackerel family (*Scombridae*) nearly related to the gigantic tunny, but smaller, longer in body, and without teeth on the vomer. There are two American species. One (*Sarda sarda*) lives in the open seas, except at spawning time, from Cape Cod to Cape Sable, and occasionally in the Gulf of Mexico, where it weighs 10 to 12 pounds. In color it is dark steel blue above,

with numerous dark narrow strips obliquely downward and forward from the back, and the under parts, silvery. The California bonito or skipjack (*Sarda chiliensis*), is heavier and is found from San Francisco northward to Japan. In the tropics, the bonito is known as the worst foe of the flying-fish. It is a free biter at spoon-bait, or it can be speared with ease from a ship's bows.

Bonitz, Hermann, hër'män bō-nīts, German classical scholar: b. Langensalza, 29 July 1814; d. Berlin, 25 July 1888. He was professor in the University of Vienna, 1849-67, director of a gymnasium at Vienna from 1867, and a member of the Academy of Sciences. He was a profound student of Plato and Aristotle and was the author of 'Ueber die Kategorien des Aristoteles' (1853); 'Platorische Studien' (1858-60); 'Aristotelische Studien' (1862-7).

Bonn, a city of the Prussian province of the Rhine, formerly the residence of the Electors of Cologne, on the left bank of the Rhine, over which there is a magnificent new bridge, erected at a cost of \$1,000,000, with a central span of 600 feet. It is a flourishing place, and has been greatly extended and improved in recent years, though it still has many narrow irregular streets. The town hall, completed 1782, is one of the handsomest of its edifices. Another important building is the cathedral, cruciform in plan, and forming an imposing and picturesque example of the late Romanesque style of architecture. The greater part of it dates from the 13th century. But all other buildings and institutions are eclipsed by the celebrity of the university, the charter of which was given 18 Oct. 1818, at Aix-la-Chapelle, by the king of Prussia, who at the same time endowed it with an annual income of about \$60,000. The former residence of the Elector of Cologne was bestowed on the university, and was fitted up at great expense, being surpassed in extent and beauty probably by no university building in Europe. The university possesses a library of more than 275,000 volumes, 1,235 incunabula and 1,376 MSS.; a museum of antiquities, a collection of casts of the principal ancient statues, a collection of coins, observatory, botanic garden, etc. The paintings in the Academical Hall (among others, the great allegorical picture, the 'Christian Church') were executed by some pupils of Cornelius. In the front of the university is an extensive garden, with fine old avenues of trees, while from this quarter runs westward a broad straight avenue, half a mile long, planted with horse-chestnuts, passing the observatory, and leading to the botanic garden and natural history collections of the university, and to the chemical laboratory, the anatomy building, etc. In this quarter also are grounds and buildings for the use of the agricultural institute. Particular advantages are afforded for the education of young men intended for instructors. Many men distinguished in various branches of science have been connected with the university, including Arndt, A. W. Schlegel, and the historian Niebuhr. The exertions of the government to collect in Bonn all the means of instruction, united with the charms of the place and the beauties of the scenery, have made the place famous. In 1901 the students numbered over 2,400. The manufactures, which are not very

important, comprise carpets, machinery, soap, chemicals, stoneware, etc. The means of communication are ample, both by the steamers which ply upon the Rhine and by the railways. Prince Albert studied at Bonn and Beethoven was born there, the house of his birth being now a museum. There are statues of Beethoven and Arndt, a monument commemorative of the war of 1870-1, a monumental fountain, etc. The antiquity of Bonn is considerable, and, as the residence of the electors of Cologne, it is of historical importance. Pop. (1900) 50,737.

Bonn, University of. See BONN.

Bonnassieux, Jean, zhōn bō-nā-syē, French sculptor: b. Paumissieres, 1810; d. 1892. He studied in Paris and in 1836 received the Prix de Rome. He gained the favor of the French clergy by refusing to model a statue of Voltaire for the façade of the Louvre and thereafter did much work for churches. He was commissioned in 1857 to model a colossal statue of Notre Dame de France for the valley of Puy from the bronze cannon taken at Sebastopol. Other important works of his are 'Amour se compant les ailes'; 'David Berger, 1814'; and 'Meditation,' for which last he received the cross of the Legion of Honor.

Bonnat, Léon Joseph Florentin, lā-ôn zhō-sēf flō-rōn-tān bō-nā, French painter: b. Bayonne, 20 June 1833. When a young man he spent several years in Spain and Italy. He studied under Madrazo at Madrid, and under Léon Cogniet at Paris, first gaining recognition at the Paris Salon in 1861, when he received a second-class medal. The list of his honors is a large one, including the medal of honor at the Salon of 1869. In the Legion of Honor he was made chevalier in 1867, officer in 1874, and commander in 1882. He paints portraits and genre subjects; many of these are reminiscences of his visits to Italy and Egypt. He became a member of the Institute in 1874, and was chosen chief professor of painting in the Ecole des Beaux Arts in 1888. His work shows the influence of Velasquez and Ribera, and his portraits, such as those of Thiers, Victor Hugo, and Don Carlos, are remarkable for their realism. He has painted the portraits of many Americans and his portrait work is well known in this country.

Bonnechese, François Paul Emile Boiss-normand de, frān-swā pōl ā-mēl bwā-nōr-mān bōn-shōz, French poet and historian: b. Leyerdorf, Holland, 1801; d. 1875. He was librarian of the palace of Saint Cloud for some years and subsequently held similar posts. His one notable poetical composition is 'The Death of Bailly' (1833). Besides a 'History of France' he was author of 'Reformers Before the 16th Century Reformation' (1844); 'The Four Conquests of England' (1851); 'History of England' (1859); 'Bertrand du Guesclen' (1866).

Bonnemère, Joseph Eugène, zhō-sēf è-zhān bōn-mār, French historian: b. Saumur, 21 Feb. 1813. In early life he wrote a number of plays; but owes his reputation to a series of historical publications, 'History of the Peasants' (1856); 'Vendee, in 1793' (1866); 'Popular History of France' (1874-9); 'History of the Religious Wars in the Sixteenth Century' (1886); etc.

Bonner, Edmund, English prelate: b. about 1495; d. London, 5 Sept. 1569. For his skill in canon law he was patronized by Cardinal Wolsey, on whose death he acquired the favor of Henry VIII., who made him one of his chaplains, and sent him to Rome on business connected with his divorce from Queen Catharine. In 1535 he was made archdeacon of Leicester. In 1538 he was nominated bishop of Hereford, being then ambassador at Paris; but before his consecration he was translated to the see of London. In 1542-3 he was ambassador to the Emperor Charles V. After Edward VI.'s accession in 1547 he was deprived of his bishopric for non-obedience in connection with the injunctions and the 'Book of Homilies.' He was shortly afterward restored, but still continuing to act with contumacy, he was, after a long trial, once more deprived of his see, and committed to the Marshalsea (1549); from which prison, on the accession of Mary, he was released, and once more restored in 1553. During this reign a most sanguinary persecution of the Protestants took place, many of whom Bonner was instrumental in bringing to the stake, though it appears he was hardly severe enough to meet the wishes of the king and queen. When Elizabeth succeeded he went with the rest of the bishops to meet her at Highgate, but was coldly received. He remained, however, unmolested, until his refusal to take the oath of supremacy; on which he was committed to the Marshalsea (1560), where he remained a prisoner for nearly 10 years, until his death. He was buried at midnight, to avoid any disturbance on the part of the populace, to whom he was extremely obnoxious.

Bonner, Robert, American publisher: b. near Londonderry, Ireland, 28 April 1824; d. New York, 6 July 1899. Coming to the United States in 1839 he learned the printer's trade on the *Hartford Courant*, and gained the reputation of being the most rapid compositor in Connecticut. In 1844 he removed to New York, and seven years later had saved enough money to buy the plant of the 'Merchants' Ledger,' a small business periodical. Changing its name to the 'New York Ledger,' he turned it into a literary publication, printing the most popular kind of stories. This, combined with sensational advertising methods, and the unprecedented prices paid to famous contributors, soon gave the 'Ledger' an enormous circulation. Henry Ward Beecher was paid \$30,000 for his 'Norwood'; Tennyson received \$5,000 for a short poem, and Dickens the same amount for a short story. At times \$25,000 a week was spent in advertising the paper. Retiring in 1887, the rest of his life was spent in indulging his taste for fast horses. It was his ambition to own the fastest trotters in existence, and whenever he purchased a record breaker, the animal was immediately withdrawn from public racing. His expenditures for fast horses exceeded \$600,000. Some of them and their cost were: Dexter, \$35,000; Rarus, \$36,000; Maud S., \$40,000; Sunol, \$41,000. He was a generous giver to many charitable institutions and causes, to Princeton University and the Fifth Avenue Presbyterian Church. He had a genuine dislike for publicity, and many of his benefactions were never made public till after his death.

Bonnet, Charles, Swiss naturalist and metaphysician: b. Geneva, 13 March 1720; d. Genthod, 20 May 1793. His essay 'On Aphides,' in which he proved that they propagated without coition, procured him in his 20th year the place of a corresponding member of the Academy of Sciences at Paris. Soon afterward he partook in the discoveries of Trembley respecting the polypus, and made interesting observations on the respiration of caterpillars and butterflies, and on the structure of the tapeworm. Bonnet was a close and exact observer. He carried religious contemplations into the study of nature. In his views of the human soul many traces of materialism are to be found; for instance, the derivation of all ideas from the movements of the nerve fibres. Of his works on natural history and metaphysics there are two collections; one in 9 volumes 4to, the other in 18 volumes 8vo (Neufchâtel, 1779). The most celebrated are 'Traité d'Insectologie'; 'Recherches sur l'Usage des Feuilles dans les Plantes'; 'Considérations sur les Corps organisés'; 'Contemplation de la Nature'; 'Essai analytique sur les Facultés de l'Ame'; 'Palingénésie Philosophique'; and 'Essai de Psychologie.'

Bonnet, in fortification, an elevation of the parapet at a salient angle, designed to prevent the enfiling of the adjoining front of the work, where it is situated. The bonnet accomplishes, however, only part of this object, and is subject, at least in field-works, to the disadvantage, that the men destined for its defense are too much exposed to be taken in flank by the fire of the enemy, on account of the necessary elevation of the banquette, a fault which cannot occur in the works of a fortress which are well laid out. The term also denotes a covering for the head, now especially applied to one worn by females. In England the bonnet was superseded by the hat as a head-dress two or three centuries ago, but continued to be distinctive of Scotland to a later period.

Bonnet-head, a small shark of the genus *Remiceps*, frequenting warm seas and related to the shovel-heads (q.v.).

Bonnet Monkey. See MACAQUE.

Bonnet-piece, a Scotch coin, so called from the king's head on it being decorated with a bonnet instead of a crown. It was struck by James V., and is dated 1539. Bonnet-pieces are very rare and in high estimation among antiquaries.

Bonnet-rouge, bō-nā-roozh, an emblem of liberty during the French Revolution, and worn as a head-dress by all who wished to show themselves sufficiently advanced in democratical principles. It is said by some to have been adopted in imitation of the Phrygian cap of the same color which was worn by those who had obtained emancipation from slavery, while others maintain that it had a much more lowly origin, and was borrowed either from the Marsellais bands that flocked to Paris, or from a few Swiss soldiers who, having been sentenced to the galleys for insubordination to their officers, obtained their liberty on the acceptance of the constitution in 1790. Having returned in a kind of triumphal procession, wearing the red cap, which had formed part of their galley dress, the fancy of the people was struck, and the

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bonnet-rouge was considered indispensable to every true patriot. Even the unfortunate Louis XVI. wore it when paraded through the streets, after narrowly escaping with his life from the mob which had burst into his palace. After it had ceased to be generally worn, it became the distinctive badge of the men of the Mountain. During the storms of more recent periods attempts have repeatedly been made to bring it again into fashion. These have not been successful, but the revolutionary cap rejected by France has met with a more favorable reception abroad, particularly among the newly formed republics of America, where it is often stamped upon coins, or used as an emblem upon seals. Under the restoration of the Bourbons the soubriquet of bonnets-rouges was applied to individuals who either had figured in the revolution or were supposed to hold revolutionary principles.

Bonneval, bôn-vał, Claude Alexander (COUNT DE OR ACHMET PASHA), French adventurer: b. Coussac, 1675; d. Constantinople, 1747. In the war of the Spanish Succession he obtained a regiment and distinguished himself by his valor as well as by his excesses. He was, in 1706, appointed major-general by Prince Eugene, and fought against his native country. At the Peace of Rastadt in 1714, by the interference of Prince Eugene, the process against him for high treason was withdrawn, and he was allowed to return to his estates. In 1716 he was lieutenant field-marshal of the Austrian infantry, and distinguished himself by his valor against the Turks at Peterwarden (1716). In 1718 Bonneval was made a member of the imperial council of war, but his licentiousness and indiscretion induced Prince Eugene to get rid of him by appointing him in 1723 master-general of the ordnance in the Netherlands. To revenge himself on Eugene, he sent complaints to Vienna against the governor, the Marquis de Prié; but the latter received an order to arrest Bonneval, and to imprison him in the citadel of Antwerp. Bonneval being afterward ordered to appear at Vienna and give an explanation of his conduct, spent a month at The Hague before he chose to comply with the summons. He was therefore confined in the castle of Spielberg, near Brunn, and condemned to death by the imperial council of war; but the sentence was changed by the emperor into one year's imprisonment and exile. Bonneval now went to Constantinople, where the fame of his deeds and his humanity toward the Turkish prisoners of war procured him a kind reception. He consented to change his religion, received instructions in Mohammedanism from the mufti, and received the name of Achmet, with a large salary. He was made a pasha of three tails, commanded a large army, defeated the Austrians on the Danube, and quelled an insurrection in Arabia Petrea. His exertions, as commander of the bombardiers, to improve the Turkish artillery, were opposed by the jealousy of powerful pashas, the irresolution of Mohammed V., and the dislike of the Turkish troops to all European institutions. He enjoyed, however, the pleasures of his situation. The memoirs of his life under his name are not genuine.

Bonneville, bôn-vîl, Benjamin L. E., American soldier and explorer: b. France about 1795;

d. Fort Smith, Ark., 12 June 1878. He graduated from West Point 1815, became a captain of infantry 1825; and in 1831-6 engaged in an exploring expedition to the far West, across and beyond the Rocky Mountains. His journal and other manuscripts were edited and enlarged by Washington Irving, who published them under the title of 'Adventures of Captain Bonneville, U. S. A.' (1837). He fought with gallantry in the Mexican war, taking part in the siege of Vera Cruz, the battle of Cerro Gordo, the capture of San Antonio, battle of Churubusco, where he was wounded, the battle of Molino del Rey, the storming of Chapultepec, and the ensuing assault and capture of the city of Mexico. In 1857 he commanded the Gila expedition, and in 1861 was retired from active service, "for disability resulting from long and faithful service, and from sickness and exposure in the line of duty." In 1865 he was brevetted brigadier-general in the regular army "for long and faithful services." See Cullum, 'Officers and Graduates of the U. S. Military Academy,' Vol. I. (1868).

Bonneville, Lake, a lake of the Pleistocene epoch that twice filled a now desert basin of Utah. At its greatest dimensions it had an area of 20,000 square miles, and was 1,000 feet deep.

Bonney, Charles Carroll, American lawyer: b. Hamilton, N. Y., 4 Sept. 1831; d. Chicago, Ill., 1903. In 1850 he removed to Peoria, Ill., took an active part in establishing the present educational system of that State; was admitted to the bar 1852, settled in Chicago in 1860, and acquired a large and successful practice. He was one of the originators of the law and order movement and was president of the National Law and Order League 1885-93. In 1893 he was the organizer and general president of the World's Congresses held at the Columbian Exposition; there were over two hundred of them, and they proved a marked feature of the World's Fair. Besides numerous pamphlets, addresses and essays on public questions he has written 'Rules of Law for the Carriage and Delivery of Persons and Property by Railway' (1864); 'Summary of the Law of Marine, Fire, and Life Insurance' (1865); 'Our Remedy in the Laws' (1887); and edited A. W. Arrington's 'Poems' (1869).

Bonney, Thomas George, English geologist: b. Rugeley, 27 July 1833. He was president of the Geological Society of London 1884-6, and in 1899 became vice-president of the Royal Society. He has written 'Outline Sketches in the High Alps of Dauphine' (1865); 'The Alpine Regions' (1868); 'The Story of Our Planet' (1893); 'Charles Lyell and Modern Geology' (1895); 'Ice Work' (1896); 'Volcanoes' (1898), and four volumes of Sermons.

Bonnie Blue Flag, a popular Confederate ballad first sung in public at the Varieties Theatre in New Orleans in 1861.

Bonnières, Robert de, ro-bâr dè bôn-nî-âr, French journalist and novelist: b. Paris, 7 April 1850. He began his literary career as contributor to Paris journals of spirited but waspish biographies of contemporary men; these were collected and published in three successive volumes of 'Memoirs of To-Day.' His novels are full of transparent allusions to noted persons.

and have had a very great vogue. In one of them, 'The Monarch,' he portrays high Jewish society in Paris.

Bonnivard, François de, frän-swä dë bö-ne-vär, Swiss patriot, a younger son of a family which held large possessions under the House of Savoy: b. Syssel about 1496; d. Geneva, 1570. In 1513 he became prior of St. Victor at Geneva, but falling under the suspicion of the Duke of Savoy, was taken prisoner by him in 1519. After 20 months' imprisonment he was set free, but in 1530 he was again seized and taken to the castle of Chillon at the east end of the Lake of Geneva, where he was imprisoned for six years, the last four in that subterranean vault which Byron has made famous by his poem on the sufferings of 'The Prisoner of Chillon.' He left the town his books, which were the nucleus of the Geneva library. His chief works are his 'Chroniques de Genève' (1551; new ed. 2 vols. 1831), and 'De l'Ancienne et Nouvelle Police de Genève' (1555). See Gribble, 'Lake Geneva and Its Literary Landmarks' (1901).

Bonny, a river of west Africa, one of the mouths of the Niger. The town of the same name is situated on the eastern bank of the river near its mouth. It has a good harbor and does a considerable trade in palm-oil, but the climate is unsuitable for Europeans. Pop. about 8,000.

Bonnycastle, Charles, English mathematician: b. Woolwich, 1792; d. Charlottesville, Va., October 1840. He was professor of mathematics at Woolwich Military Academy, professor of natural philosophy in the University of Virginia (1825-7), and of mathematics there from 1827. His publications included 'Elements of Geometry'; 'Elements of Algebra'; 'Mensuration,' etc.

Bonnycastle, Sir Richard Henry, English military engineer: b. 1791; d. 1848. He was a brother of Charles Bonnycastle (q.v.) and spent the greater part of his life in British North America. He was author of 'Spanish America' (1818); 'The Canadas in 1842' (1842); 'Canada and the Canadians in 1846' (1846); and 'Canada as It Was, Is, and May Be' (1846).

Bonomi, Giuseppe, joo-sëp'pë bö-nō'me, Italian artist: b. Rome, 9 Oct. 1796; d. 3 March 1878. He was a son of Giuseppe Bonomi, the architect. He studied art in London, and became famous as a draftsman, especially of Egyptian remains. He repeatedly visited Egypt and the Holy Land, and illustrated important works by Wilkinson, Birch, Sharpe, Lepsius, and other Egyptologists. He also published a work of his own on Nineveh, and at his death was curator of Soane's Museum.

Bononcini, or Buononcini, Giovanni Battista, jō-vän'ne bö-nōn-chē'ne, Italian composer: b. Modena about 1660; d. about 1750. His proficiency on the violoncello gained him admittance into the band of the Emperor Leopold at Vienna, where, at the age of 18, in emulation of Scarlatti, he wrote an opera called 'Camilla,' which was favorably received. In England for several years scarcely any opera was tolerated which did not contain some of Bononcini's airs, and upon the almost simultaneous arrival of himself and Handel in London, notwithstanding the superiority of the latter, two parties, the one for Bononcini and the

other for Handel, were formed, between whom an exciting contest was waged for several years. Gradually, however, Bononcini's popularity waned, and having been detected in an act of musical plagiarism, he left England in 1733, found his way to Paris and Vienna, and finally went to Venice, where all traces of him are lost.

Bononcini, Giovanni Maria, Italian musician: b. Modena, 1640; d. 19 Nov. 1678. He was educated at Bologna, was in the service of the Duke of Modena, Francis II., and also maestro di capella of San Giovanni in Monti. He was considered an authority on the theory of music on account of his work 'Musico pratico'; he also wrote numerous musical compositions, both vocal and instrumental.

Bonone, bō-nō'nā, Carlo, Italian painter: b. Ferrara, 1569; d. 1632. He studied the works of the Caracci and Veronese, and shows the influence of both styles in his own work. He taught painting in Ferrara, having many prominent painters of the town under his instruction. Among his paintings are 'The Arisen Christ' and 'Patriarchs and Prophets.'

Bonpland, Aimé, ā-mā bôn-plān, JACQUES ALEXANDRE, French naturalist, noted as the friend of Humboldt, and the companion of his wanderings: b. Rochelle, 22 Aug. 1773; d. Corrientes, Argentina, May 1858. He studied medicine, and served for a while in the French navy as surgeon. Having returned to Paris to continue his studies, he there made the acquaintance of Humboldt, then a young man actively engaged in the pursuit of scientific knowledge at the French capital. On the latter projecting his journey to the New World, Bonpland readily agreed to accompany him, and shared in all the adventures and toils of that celebrated expedition. In the course of it he collected upward of 6,000 plants, previously unknown, and on his return to France in 1804 presented his herbarium to the Museum of Natural History, and had a pension granted him by the Emperor Napoleon. A great friendship subsisted between him and the Empress Josephine, who frequently endeavored to cultivate in her garden at Malmaison the flowers whose seeds he had brought from the tropics. On the Restoration he proceeded to South America, and became professor of natural history at Buenos Ayres. He subsequently made an extensive journey across the Pampas to the foot of the Andes, and ascended the river Parana into Paraguay, but was arrested by Dr. Francia, the governor of Paraguay, as a spy, and detained a prisoner for eight years, till 1820. He afterward settled at San Borja, near Monte Video, and after 1850 lived at Corrientes.

Bonsal, Stephen, American journalist: b. Virginia, 1863. He was educated at Concord and Heidelberg. In the Bulgarian-Servian war he was special correspondent of the New York Herald, serving in the same capacity in Macedonia and Cuba. He has been secretary of Legation of the United States in Pekin, Madrid, Tokio, and Corea. He has written 'The Real Condition of Cuba'; 'The Fight for Santiago'; 'Morocco as It Is'; 'Across the Pacific.'

Bonstetten, bön-stät'ën, Karl Victor von, Swiss publicist: b. Bern, 3 Sept. 1745; d. Geneva, 3 Feb. 1832. He studied at Leyden, Cam-

bridge, and Paris; entered the council of Bern, and became district governor, and, in 1795, a judge in Lugano. He lived in Italy and at Copenhagen from 1796 to 1801, and after his return settled at Geneva. Among his larger works are 'Recherches sur la Nature et les Loix de l'Imagination' (Geneva 1807); 'Pensées Diverses' (1815); 'Études de L'Homme' (1821), and 'L'Homme du Midi et L'Homme du Nord' (1824), an examination of the influence of climate. Several volumes of his correspondence have been published.

Bontebok, bôn'te-bök, a small South American antelope (*Bubalis pygargus*) closely allied to the blesbok (q.v.), but a slightly larger size, and having the continued white blaze on the face to the root of the lyrate horns. See HARTREEST.

Bonus Bill, an act reported to the United States House of Representatives by John C. Calhoun, 23 Dec. 1816, appropriating "as a fund for constructing roads and canals" the \$1,500,000 paid by the United States bank as a bonus for its charter privileges, and all future dividends from its stock. The real object was to build the Erie Canal, which New York did not feel able to do alone. Its managers,—De Witt Clinton, Gouverneur Morris, etc.,—relying on the administration holding the same ideas which Jefferson and Gallatin had formerly voiced, formed a "log-roll" in Congress with various local interests, and carried the bill by 85 to 84 in the House, and 20 to 15 in the Senate, the opposition being scatteringly local rather than sectional, or constitutional; but Madison vetoed it on strict-construction grounds. The apparent injury was to New York: the real injury was to the South. New York went on and built the canal herself, giving her an irresistible advantage over her rivals, while the South was not rich enough to build the canals from the Chesapeake to the Ohio, enriching Maryland and Virginia, nor from the Santee to the Tennessee, enriching the Carolinas and Tennessee, and if the general government had helped the Erie it must have helped the others also.

Bonvalot, Pierre Gabriel, pe-är gä-brê-ël bôn-va-lô, French explorer: b. Espagne, Aube, 1853. He traveled in central Asia, 1880-2; Persia, Turkestan, and the Pamirs, 1885-7; and in Siberia and Tonkin, 1889-90. He has written 'En Asie Centrale'; 'Du Moscou en Bactriane' (1884); 'Du Kohistane à la mer Caspienne' (1885); 'Du Caucase aux Indes à travers le Pamir' (1888).

Bonvin, François Saint, frân-swä sän bôn-vän, French genre painter: b. Vaugirard, 22 Sept. 1817; d. Saint Germain-en-Laye, 18 Dec. 1887. He was self-taught, exhibited often at the Paris Salon and received the medal of the Legion of Honor in 1870. For a long period his work was not popular, but his paintings are now much prized by collectors on account of their rich coloring and sober tone. Among them are 'Charity' (1852); 'Regimental School' (1853); 'Corner in a Church' (1880).

Bony-fish. See MENHADEN; TEN-POUNDER.

Bony, or Gar Pike. See GAR.

Bonzes, bôn'zēs, a name given by Europeans to the priests of the religion of Fo, or Buddha, in eastern Asia, particularly in China, Burma, Tonquin, Cochin-China, and Japan.

As these priests live together in monasteries, unmarried, they have some resemblance to the monks of the Christian Church. They do penance, and pray for the sins of the laity, who secure them from want by endowments and alms. The female bonzes may be compared to the Christian nuns, as the religion of Fo suffers no priestesses, but admits the social union of pious virgins and widows, under monastic vows, for the performance of religious exercises. The bonzes are commonly acquainted only with the external forms of worship and the idols, without understanding the meaning of their religious symbols.

Booby, a name given long ago by British sailors to several of the smaller tropical species of gannet (q.v.), because of their "stupidity," which consisted simply in their fearlessness when visited upon their island breeding places. Having had no acquaintance with mankind they had no reason to fear him. Most of the species are widespread, and, in their haunts abundant. One species (*Sula variegata*) is, however, confined to the coasts of Peru, where it contributes largely to the valuable guano deposits on the islands there.

Book. Used without qualification, the term currently implies a printed literary composition in many sheets; but in law and custom it has received three extensions, one of form and two of matter. The form includes anything bound like a book—volumes of accounts, or of blank leaves for keeping them or for indexing, etc., and even "books" of gold-leaf, 25 thin strips in a cover. The matter includes—by English statute law, "every volume, part or division of a volume, pamphlet, sheet of letter-press, sheet of music, map, chart, or plan separately published": in literary usage, the written compositions of ancient times on whatever material, if of some volume.

Historically, it is curious that primitive attention has invariably seized first on, and named the writing after, neither form nor matter, nor even the method of writing, but the material on which the writing was executed: every name in common use, present or past, refers to this. "Book," A.-S. *bōc*, is from an old Teutonic *boks*, that is, "the beeches," tablets of beech-bark on which runes were cut or painted; Latin *liber*, whence French *livre* and our "library," was the same thing, the inner bark of a tree, and the name was later given to the papyrus tissue from its bark-like appearance; *codex* or *caudex*, our "code," and still used in its Latin form for old texts, meant the trunk of a tree, then wooden tablets, then square volumes like wooden blocks instead of those in scrolls; the Greek *byblos*, our "Bible," was another name for the papyrus; and modern usage clings to the same connection of ideas—we speak of reading "a paper" before an audience. On the other hand, the words "write," "inscribe," and "scripture," and the various "-graphs," all from words meaning to cut, commemorate a time when all writing was by scoring lines on some hard substance. Of course special terms refer to various aspects of the book: "volume" (Latin *volumen*, from *volvo*, to roll) was the wooden roller around which a convenient section of a long composition was twisted; "tome" means a cutting—of the book into parts, exactly the same as "section."

BOOK

It is difficult to say at just what point the ancient writings may properly be called "books." It is evident that mere scorings or paintings of short compositions on a single surface—runes, hymns, poems, epistles, proclamations, business documents, or what not—cannot be called books, even if the surface is large; though Lord Macaulay facetiously speaks of a rising young Assyrian architect who "published a bridge and four walls in honor of the reigning emperor." On the other hand, long compositions carried over many tablets, grouped in numbered or lettered pages and divided into "volumes" or shelves, and even sometimes with the owner's book-plate (q.v.) attached, cannot be denied the name; nor can extensive compositions on papyrus like the 'Book of the Dead,' dating back well toward 2000 B.C. if not earlier, nor the famous 'Papyrus Prisse,' the oldest volume known to exist. The Babylonian and Assyrian books were drawn on clay tablets or polygonal cylinders (afterward hardened) with an iron stylus, producing the wedge-shaped or "cuneiform" characters, some of them so small and skilfully executed that they suggest the use of a magnifying glass—quite likely a ball of crystal. These about the 7th century B.C. had begun to be gathered into royal or temple libraries, to the inestimable service of modern historical research: the vast majority of our knowledge of old Babylonia and Assyria comes from two great libraries, that of Ashurbanipal (Sardanapalus: 668-626 B.C.) at Nineveh, and that of the Temple of Bel at Nippur. Yet, oddly, while our civilization as a whole is a direct heir of the Babylonian, and its details owe to that, through the Greek and Latin, a score of items to one of the Egyptian, our books have no connection with the Babylonian and are the immediate progeny of the Egyptian; an unbroken sequence can be maintained from the volume in the reader's hand to the 'Papyrus Prisse,' perhaps more than 2,000 years before Christ, and containing the still older composition, regarded as the oldest extant book in the world, the 'Maxims of Ptah-Hotep,' dating probably from 2500 B.C.

Owing to the cheap and easy preparation of the papyrus tissue, by pulping the pith and spreading it out to dry, essentially like our paper, and its wonderful adaptability to literary use beyond anything discovered for many ages,—its thinness and lightness, yet hard, smooth, glossy surface showing off inks and pigments so beautifully—its use spread to Greece before the time of Herodotus at least, and to Rome, and maintained its position as a book material down to the 10th century A.D. Ali ibn el Azhad in 920 describes the different kinds of pens required for writing on paper, parchment, and papyrus (see Karabacek's 'Das Arabische Papier,' 1887). Unhappily, however, it had one insuperable defect for laws, records, or whatever else needed perpetuity: it was very sensitive to dampness, and dissolved and crumbled away in a few generations. Hence it is not merely probable but certain that the great mass of classical literature is lost forever, disintegrated and gone with its material record. The only place where any considerable finds are still possible is Egypt, whose dry climate can preserve such things for countless ages, and whose libraries had vast quantities of the best Greek and Roman works; some remarkable discoveries

have already been made there, and more may be hoped for. But for this reason, papyrus was largely supplanted for public uses, and with the wealthier collectors or authors, or for very popular books, by parchment, fine dressed skin, the material used by the Jews, Persians, and other Oriental nations. When the book had outlived its popularity or a more exigent use was found for the parchment, which was costly, the former writing was rubbed off or in, and a new book copied on, and this process was repeated sometimes six or seven times. Thanks to the fact that the erasure always left the outline of the old characters possible to revive by certain chemicals, and that for clearness the new book was written crosswise to the old, so that the imperfectly erased words should not show up through and cause confusion, these *palimpsests* have yielded us many treasures supposed to have been extinguished.

As the very name "book" shows, however, paper-pulp and skin and clay were not the only materials used for books by the ancients; in fact, it would be hard to cite any common smooth-surfaced article not so used. Animal, vegetable, and mineral substances have all been drawn on; metals, wood, wax, ivory, leaves, bark, etc. Wooden books were common among both Greeks and Romans; part of one containing Solon's laws was preserved at Athens till the 1st century. For the more important purposes, laws and edicts, they employed (before the general accession of parchment) ivory, bronze, etc.; Hannibal engraved an account of his campaigns on bronze plates, which if they could be supposed existent, would be worth excavating all South Italy for, especially as the writing must have been in Carthaginian. The antiquary Montfaucon in 1699 bought at Rome a book of six thin leaden leaves, about 4x3 inches, with covers and hinges of lead; it contained Egyptian hieroglyphics, etc. For the common needs of business and social life, however,—contracts and wills, letters either of love or friendship, memoranda, etc.,—the Romans used *diptycha* and *tabulae* or *pugillaria*—sheets covered with wax, to be written on with a stylus, and protected from contact by a raised margin, or opposite projections in the centres. Two of these, of date 169 A.D., were discovered early in the 19th century in Transylvania, and one of 1301 is preserved in the Florentine Museum. In the University of Göttingen is a Bible of palm-leaves, containing 5,376 leaves. Among the Kal-muck Tartars was found a collection of books made of long narrow leaves of varnished bark, the ink black on a white ground.

The shape of wooden and metal books, waxen and ivory tablets, and those of other hard substances, was square; but the thin flexible papyrus was too liable to dog's-ear and tear from handling in such form, and a method was adopted which has left deep traces on our book terminology—of rolling the sheets on wooden cylinders, very much in the fashion of a modern mounted map. They were written on one side only, fastened together at the edges, and glued or otherwise attached to the roller, which was called in Egyptian a *tama*, in Greek a *kulindros* (cylinder), in Latin a *volumen* (roller), our "volume." We still speak of a piece of writing poetically as a "scroll." Some of these were of huge size: specimens of Egyptian book-rolls still exist extending to 20 and even 40

yards (see Birt's 'Das Antike Buchwesen,' p. 439); but the great inconvenience of consulting such enormous sheets, and the injury to themselves in the process, caused the breaking up of lengthy literary productions into sections, each on a separate roll. Certain handy sizes became normal, like the ordinary novel or essay volume of to-day; and this conventional length of roll exercised great influence on the length of what are still called the "books"—that is, chapters—of the classical authors, one of these being about enough to make a roll or volume of. At each end of the roller was the *umbilicus* (navel) or *cornus* (knob), a boss to turn it by, and the volume was read by unrolling the scroll to expose successively the sheets or *pagina* (things "fastened" together). The title was generally written in red, on fine vellum, and pasted on the outside, which was dyed with cedrus or saffron. Much labor and expense was often involved in the ornamentation of books, and pleasant conceits were sometimes conveyed by their color. The practice of perfuming the pages to which Martial alludes, "When the page smells of cedar and mantles with royal purple," was not abandoned till very modern times. Lord Burghley, instructing the vice-chancellor of Cambridge concerning the proper presentation of some volumes to Queen Elizabeth, cautions him to "regard that the book had no savor of spike" (spikenard), "which commonly bookbinders did seek to add to make their books savor well." It seems an odd lure to book-buyers; but in this age we can hardly realize the important part played by perfumes in ages when pretty much everything and everybody smelt ill, when filth and the lack of washing or changing of clothes assailed all noses with evil stench, and an agreeable scent was one of the greatest and rarest luxuries of life. In Egypt the rolls were kept in jars holding nine or ten each; in Rome they were kept in wooden boxes or canisters, often of costly workmanship, or in parchment cases. The change from scrolls to *codices*, or square books, seems to have taken place generally in the ancient world after the adoption of parchment or vellum; they appear to have been coming into general use in Martial's time (last half of the 1st century A.D.), as he alludes to their advantages. The name *codex* is still used for the more important ancient MSS., as the "Codex Alexandrinus." Not all the parchments were folded or arranged in small square sheets as now, however: M. Santander owned a beautiful Hebrew Pentateuch written on 57 skins of Oriental leather, sewed together with threads or strips of the same material; it formed a roll of 113 French feet (120.45 English) long. And practically the same arrangement of successive surfaces had been enforced in the use of the clay or wooden tablets, from the nature of the articles. The form remained substantially unaltered throughout the Middle Ages, and being even more suitable for paper than for vellum, was ready on the invention of printing to facilitate its full development; though important differences in bulk, arising as well from the condition of the art and its materials as the fashion of the times, distinguish books of the earlier periods of printing from those of to-day.

Production and Prices (see also PUBLISHING)—It is usually assumed that until the invention of printing, books were always of

excessive rarity and costliness. This is mostly true of the Middle Ages, when the only trained chirographers were in the monasteries—working at free will and leisure and caring solely for quality, and with the express object of making the books costly. It was not so, however, in classic times, owing to that society being based on skilled slave labor. From this cause, the greatest extremes of price prevailed side by side, extreme cheapness and almost incredible dearness. When but few copies of a book were made, either by an author of slender means or by a wealthy amateur to give to friends, they were either given away, or if sold might command any price an unexpected favor of a rich man's fancy dictated; and from the same cause "unique copies"—most likely such were the three books of Philolaus the Pythagorean, for which the not rich Plato paid about \$1,600, and the few books of the philosopher Speusippus for which Aristotle paid three Attic talents or some \$3,500—were much commoner than now. On the other hand, Anaxagoras' works could be had for a drachma (about 18 cents) even when dear—a thing the more strange that two pieces of papyrus for copying an account cost in 407 B.C. 2 drachmæ 4 oboli, or about 45 cents. Perhaps there was a difference in the paper. In this same year a *diptychon*, or pair of wooden account tablets (pass-book), cost a drachma; but in Demosthenes' time, three quarters of a century later, one (probably smaller) cost only two *chalci* ("coppers"), less than a cent. All these contradictions are probably due to the lack of any regular publishing market.

The long agonies of dissolution of the Roman empire annihilated the book trade; and for centuries the only makers of books were the monk scribes, in whom the important conditions of skill, leisure, love, and patience were all fulfilled. Learning had become the exclusive privilege of a class, a privilege of which they were at once proud and jealous; and they surrounded the means of its acquisition with a pomp and circumstance that precluded the multitude from familiarity with it. In the earliest times books had received the adorning aid of ornamental art; but in the Middle Ages they reached the acme, if not of beauty and convenience, at least of cost. The favored works of the time, principally of the Christian writers, were laboriously transcribed by patient penmen, in *scriptoria* liberally maintained in the monasteries, and specially devoted to that purpose. In the process of preparation their books received the most careful attention in regard to accuracy, elegance, and solidity. In the monasteries also the work was completed; for not only were the monks transcribers, illuminators, and binders, but the same individual frequently combined the triple function in his own person. From the hands of the scribe, whose solemn adjuration at the conclusion of his task was evidence not only of his own care but of his desire that others should imitate his example, the book passed to the illuminator, whose gorgeous colors still delight the bibliophile; and from him to the binder, by whom its ponderous proportions were encased in massive covers of wood and leather, studded with knobs and bands, often of gold and silver, and closed with broad clasps—to unfasten which, letting the covers swing open on their stout hinges, was a privilege to which

not every one was permitted to aspire. For, as said Richard De Bury, "laymen, to whom it matters not whether they look at a book turned wrong side upward or spread before them in its natural order, are altogether unworthy of any communion with books." Precious metals and the less crude but equally costly productions of art contributed to swell their value, in respect of which they stood at times on an equality with houses and lands. When publicly exposed, they were frequently secured by chains; they were protected by special statutes; were subjects of grave negotiation; solemnly bequeathed by will, and lent only to the higher orders, who were compelled to deposit ample pledges for their return. Even so late as 1471, Louis XI. was compelled by the faculty of medicine at Paris to deposit a valuable security, and give a responsible endorser, in order to obtain the loan of the works of Rhasis, an Arabian physician. Instances of the immense prices of special books are familiar, as of King Alfred's giving eight hides (perhaps 500 acres) of land for one book, but England was well-nigh bookless then; of the countess of Anjou giving 200 sheep and other articles for a book of homilies of a bishop—an enthusiastic lady might do so if she liked the bishop; and of other fancy prices for very fine books, not however more than modern collectors might for superb copies. The form in these cases often counted for more than the matter, just as now. On the other hand, in 1431, shortly before the invention of printing, Peter Lombard's works sold at Caen for 7 francs, or \$1.30, probably equal to about \$10 now; but he was the most popular and widely circulated author in the Christian world before Thomas à Kempis, and it was to the interest of the Church to multiply his works. Making all allowances, books were very scarce and costly.

Arrangement of a Book.—The first page or *recto* of the first leaf or "folio" is technically known as a bastard or half-title page; the next page or *verso* of the first folio is left blank. (The term "folio," however, as usually employed by printers, means simply page number.) Then follows the title-page proper, usually with a blank page at the back. In many books there intervenes a preface or introduction, a dedication, and a table of contents, before the main body of the book begins; the table of contents is sometimes before and sometimes after the introduction and preface. If any portion of the book is out of place, there are two ways by which the true order may be discovered. At the outer corner, or in the centre above the reading matter, or in pages with a chapter heading usually in the centre at the bottom of the page, is a numeral either Arabic or Roman—1, 2, 3, or i, ii, iii; the almost universal custom now is to use the Roman numerals for prefaces and introductions, and the Arabic for the body of the text, and in catalogues these are indicated thus: pp. xxxvii, 325—that is 27 pages introduction paged with Roman letters, and 325 of text paged with Arabic. As a guide to the binders in gathering the sheets, also, each "form" as printed on the press—the number of pages printed on one sheet, to be folded and cut later into the proper order of reading—has at the bottom of its first page a number or letter in sequence through the book; that is, if each sheet as printed has eight pages on it, then

pages 1, 9, 17, etc.,—the *outside* sheet of each form, which lies on top and visible when the sheet is folded,—will have the numbers 1, 2, 3, etc., or the letters A, B, C, etc., called "signatures," to show the binder in what order the folded sheets are to be assembled. If the forms outnumber the letters of the alphabet when these are used, the signature series continues either as AA or 2A, etc. When two sections of a book begin printing simultaneously for expedition, and as it is uncertain where the first will end, the second has its page folios begun by guesswork—if the first runs over it is necessary to duplicate a certain number of the closing pages of the first section, as 480A, 481A, etc., or else to continue the closing number, as 496A, 496B, etc., or if only one or two, 496½, 496¾.

Sizes of Books.—The copyists made up their paper or vellum books by folding four, five, or six sheets and placing one within the other, making quires or gatherings of 8, 10, or 12 leaves, known respectively as quaternions, quinterns or quinternions, and sexterns, or in Greek tetradia, pentadia, and hexadia. The first printers adopted the same method, printing one page at a time and only on one side of the sheet; the register or collation of the quires for guide to the binder was given in the colophon (q.v. below), and only later supplanted by a signature on each quire, at first inserted by hand, and first printed at Cologne in 1472. When more than one page was printed at once, the number of times the paper had to be folded was a fair guide to the dimensions of the page, at a time when (and for ages later) the paper was made by hand, on frames whose size was held closely alike by the exigencies of human arms; and folio, quarto, octavo, duodecimo, etc., expressed not only the absolute fact of folding, but the constructive fact of size. These names were conveniently abbreviated, except the first, to 4to, 8vo, 12mo; and when improved machinery and larger sheets of paper enabled still more sheets to be printed at once, the Latin names to correspond were not used at all, the terms 16mo, 24mo, 32mo, being employed at once. All these names still survive, though—with the advent of great paper-mills and machinery which make any size desired for an edition, so long as it is an "engine run," the actual printing on large editions of 64 pages at a time, and minute calculations which figure to an eighth of an inch margin—they have ceased to express any fact worth knowing; and in the United States it is now more usual to give on catalogues the height and breadth of pages. But in Europe the old fashion still prevails. So far as the names now mean anything, a 16mo indicates the usual size of a popular volume or essay volume, and an octavo the stately and dignified memoir or volume of travel or "complete works" or cyclopædia; but in fact even these are rarely printed in less than 16s. A sheet folded in the middle forms two leaves or four pages; and a book composed of such sheets is styled a folio, whether it measure a foot and a half or four feet high. When the sheet is again folded it makes a quarto. In hand-made paper (that used in nearly all the small special editions and those of bibliographical interest) the water line runs either across or down the page, according to the number of foldings. The following scheme is serviceable: Folio, folded once, 4 pages, water line perpen-

dicular; quarto, twice, horizontal; octavo, four times, perpendicular; duodecimo, six times, horizontal; 16mo, horizontal; 18mo, perpendicular; 32mo, perpendicular; 36mo, 48mo, 64mo, horizontal; 72mo, 96mo, perpendicular. In Great Britain for a long period printing paper was chiefly of three sizes—royal, demy, and crown; and the book was large or small according to which was used. Demy was the commonest, and the demy octavo was the established form of standard editions. Among books as among men there are giants and dwarfs. The British Museum has the largest and the smallest in the world. The former is an atlas seven feet high, of the 15th century, completely concealing a tall man between the pages, with a binding and clasp which make it look as solid as the walls of a room; the latter is a tiny "bijou" almanac less than an inch square, bound in red morocco, easily to be carried in the finger of a lady's glove. Certain church books in the Escorial are described as six by four feet; and the "Antiquity" volumes of the Napoleonic 'Description de l'Egypte' are $37\frac{1}{2}$ inches high. The Thumb Bible or Toy Bible, on the other hand, was one by one and a half inches; it was not really a Bible, but an abstract, printed in 1693 and dedicated to the Duke of Gloucester, and repeatedly reprinted. Hoepli's 'Divina Commedia' (1878) is less than $2\frac{1}{4}$ by $2\frac{1}{2}$ inches; and Pickering's diamond edition of Tasso measures $3\frac{1}{2}$ inches high by $1\frac{3}{8}$ wide.

Colophons.—These originated with the Assyrian scribes in the 7th century B.C. at latest: Ashurbanipal's in the Nineveh library put at the end of the last column of their cylinders a register of the documents composing the "book." The early printers followed the same style, using the last paragraph of the last page—now called by English bookmen the colophon (Greek, apex or terminus), by French the *souscription*, by Germans the *schlusschrift*—to give details about the book, which we should now assign to the title page, or merely for a sort of *envoi* or "send-off." The usual terminus of books was "Explicit," "Hic Finis," "Finis," "Here Endeth," or something of the sort; but some printers expanded it into elaborate epilogues or postfaces. Caxton is notable for this; see examples in Blade's 'Caxton,' and for others see Legrand's 'Bibliographie Hellénique' (1885). With development of the title-page, the colophon disappeared, though instances are found well into the 16th century.

Title-Pages.—It is curious that while the early development of printing ran to enormous and elaborate title-pages, Caxton has none at all, except one to a work not certainly his, 'The Chastising of God's Children' (?1491); and even that contains only three lines of ordinary print. But in Venice as early as 1474 a 'Calendario' by John de Monteregio was issued by Pictor, Loslein, and Ratdolt, with a quaint rhyming title-page, with place, date, and names at the foot. A facsimile is given in Bouchot's 'The Printed Book.' The treatment of the title-page has varied enormously with different periods. In the 16th and 17th centuries it was at its worst: the object apparently being to make it a digest of the entire contents of the book, (Nares' 'Life of Burleigh,' of which Macaulay says that "the title is as long as an ordinary preface," is a mild example in the 19th), and half destroying the very object of the title by

making it difficult to wade through and come at the real theme. Frequently it gave a laudatory description of the book, a plan which if adopted to-day would save the reviewers the trouble of reading the preface: "A Book Right Rare and Strange," "Very Necessary to be Known," "Very Pleasant and Beneficial," etc., are familiar to the student of early printing. Modern titles are thought to violate both good taste and good business judgment in going beyond a short plain sentence or name; but they sometimes do worse by misleading the cataloguer, as when Ruskin's 'Notes on the Construction of Sheepfolds' is classed among works on live stock. Double titles, as where a sub-title is given of a seemingly different purport from the main one, are also perilous. As to the frequent practice of reissuing an old book under a new title, it is pure fraud, wasting the money of libraries and private buyers on what they have already or do not want, throwing catalogues out, and making confusion all around. The punishment of using a title already appropriated, even unknowingly, is direct and by law, for the title of a book is protected by law as much as any other part of the contents. For the lore and facsimiles of title-pages, see Andrew Lang's 'Old French Title-Pages' in 'Books and Bookmen'; Le Petit's 'Principales Editions originales d'Ecrivains français' (1888); and Konnecke's 'Bilderatlas' (1887).

Dating of Books.—One of the most exasperating traits of the early printers, like the monkish scribes, was its rarely occurring to them to put dates to their books. Only five out of 21 of the known works of Colard Mansion, Caxton's master, are dated, and more than two thirds of Caxton's own are dateless. On the other hand, in the colophon to the 'Moral Proverbs' and in the 'Book of the Knight of the Tower,' the dates are set down with excessive minuteness, even to the month and day. Modern publishers only fail to date a work when it is out of date and the fact is to be concealed from the buyer; a common deception of the trade is to reissue an old work with a new title-page and usually a new copyright date, sometimes shifting the introductory matter so as to change the pagination or "folioing." The usual and now universal date is either by Roman numerals (an antiquated annoyance it would be better to abolish), or by Arabic numerals, which for some inscrutable reason are held a trifle underbred. In the earlier books some queer freaks are indulged in. One is to put Roman lower-case numerals before some of the capitals as multipliers; unfortunately, others use exactly the same as signs of subtraction, and others still use capital letters as subtractors, so that the reader's guess needs confirming from outside. For example:

M CCCC iijXX VIII (1498: $1000 + 400 + 4 \times 20 + 8$).
 M iiijC iijXX Viiij (1488: $1000 + 4 \times 100 + 4 \times 20 + 8$).
 M iijjD (1496: $1000 + 500 - 4$).
 M IIID (1497: $1500 - 3$).

Sometimes the early printer used odd chronograms, or titles in which a date is expressed by the numeral value of the letters contained in or marked in it; in some cases repeating in this a date already given on the title-page. For instance, 'De spIrItaLI IMItatIone ChrIstI saCræ et VtILes pIIIs In LVCEM Datæ a R. P. Antonio Van den Stock Societatis Jesu, Ruræmundæ, Apud Gasparem du Pres'—a

BOOK

book with two chronograms on 1658 in the title, but a superfluity in the centre, and containing in the text over 1,500 on the same date. Two modern volumes of chronograms are Hilson's (1882 and 1885).

The date is often determined approximately by the water-marks on the paper; but this is one of the most persistently forged of all things, and demands the greatest knowledge and judgment.

Place of Publication.—This is not always instantly apparent even when printed, as the various local forms and their varied Latinizations or the use of obsolete terms often make a bewildering complexity for a single place; or a punning or pseudo-classical translation may be used, not a true ancient form; or the same Latin or Greek form may mean one of two or three places; or it may be used expressly to throw the inquirer off the track. The latter is of course undiscoverable except by outside evidence, which however is forthcoming in a surprising number of cases. The motive may be anything from sincere religious or patriotic zeal to the most bestial criminality; most "shady" modern literature has either no assigned place of publication or a false one, and some are "published" an immense distance from where they are printed—a common enough thing in legitimate publication in modern times, though practically unknown in early ones, printer and publisher being the same. Hundreds of European books are nominally published at Pekin, or Tokio, or Calcutta; the unsavory products of Parisian presses are usually fathered on some Dutch or Belgian city; and Sir Richard Burton's unexpurgated 'Arabian Nights' was accredited to Benares, India.

The following list of un-English forms of the chief centres of past publication will be useful (for a full one, see 'Dictionnaire de Géographie Ancienne' (Paris 1870):

Argentoratum: Stras-	Gippesvicum: Ipswich.
burg.	Gratianopolis: Gré-
Augusta, Augusta Vin-	noble.
delicorum: Augs-	Hafnia: Copenhagen.
burg.	Hala: Halle.
Basilea: Basle.	Herbipolis ("plant-
Bipontum: Deux-	town"): Würzburg.
Ponts, Zweibrücken.	Enetia (Greek): Ven-
Bnezieh: Venice.	ice.
Bononia: Bologna or	Holmia: Stockholm.
Boulogne.	Insula or Insulæ ("the
Cadomum: Caen.	Isle," l'Isle): Lille.
Cæsaraugusta: Sara-	Irenopolis ("City of
gossa.	Peace"): Berœa,
Cantabriga: Cam-	properly, but used as
bridge.	a disguise name.
Ceulen: Cologne.	Ispalis: Seville.
Civitas Tricassina:	Keulen, Kuelen: Co-
Troyes.	logne.
Colonia, Colonia Agrip-	Leodicum: Liège.
pina, in civitate Colo-	Leucopetra ("White-
niensi: Cologne.	stone"): Weissenfels.
Corona: Cronstadt.	Lipsiæ: Leipsic.
Cuelen: Cologne.	Lugdunum: Lyons.
Dordrechum or Dor-	Lugdunum Batavo-
tracum: Dort.	rum: Leyden.
Eboracum: York.	Lutetia: Paris.
Eleutheropolis ("Free-	Massilia: Marseilles.
town"): Freistadt,	Matisco: Macon.
Francavilla, Franche-	Mediolanum: Milan.
ville, etc. Also a	Mleczi, Mljetka, Mne-
disguise name.	zik: (Slav.) Venice.

Moguntiacum: Mainz.	Regiomontium
Mons Regalis: Mon-	("Kingsmount"):
dovi.	Königsberg.
Mussipons: Pont-à-	Rotomagus: Rouen.
Musson.	Sarum (i. e. Saris-
Neapolis: Naples.	bariæ): Salisbury.
Neapolis ("Newtown")	Tarvisium: Treviso.
Casimiriani: Neu-	Tornacum: Tournay.
stadt on the Hardt.	Trajectum: Utrecht.
Enipons: Innsbruck.	Trecæ: Troyes.
Olisipo: Lisbon.	Tridentum: Trent.
Oxonia: Oxford.	Turoni: Tours.
Petropolis: St. Peters-	Ulisipo, Ulyssipo,
burg.	Ulyssopolis: Lisbon.
Probatopolis ("Sheep-	Ultrajectum: Utrecht.
town"): Scha ff-	Venetia, Venetiæ, Ven-
hausen.	ezia, Venedig, Wenez
Pontimussum: Pont-à-	(local dialect): Ven-
Musson.	ice.

Pagination.—Books were printed at first exactly like manuscripts, without numbering the pages. Soon the unhandiness of this method, and the difficulty of making references, forced a numbering of the leaves; which was shortly succeeded by numbering the pages, and in some cases—of very large, closely printed books—by numbering the columns, which is occasionally done for like reasons in modern times. Books of more than one volume are usually paged separately, but in many large sets the paging is carried consecutively from beginning to end, especially where it is likely to be issued in more than one edition and divided into differing numbers of volumes; since in that case one index will answer for all, instead of having to be made over for each. In the old folios and quartos, letters were often inserted on the margin, to break the page or column into separate portions without interfering with the continuity of the text; these marginal references from the first editions of classics are often left in the modern editions, forming a convenient method of reference from one to the other. Essentially the same method is followed in some modern books, but usually by numbers instead of letters, dividing off the text into tens and fives of lines, for convenient citation and reference; in some editions of the Bible the chapters and conventional verses are marked off in the same way, to keep the original paragraphing and continuous narrative and yet be easy of comparison with the common Bibles.

Prefaces, Dedications, etc.—An introduction is properly a part of the body of the text, outlining its theme and the main divisions of the argument or narrative, or setting forth the general conditions from which the special theme is isolated and enlarged for study; the *preface* (for which among certain ultra-Teutonists the disagreeable affectation "foreword," German *Vorwort*, is substituted) is properly the author's introduction of himself or his work to the reader, explaining his general purpose, the need or place of his book, personal thanks, or comments, etc., and all such matter as needs to be stated yet is not pertinent to the exact subject. In old times it was like the prologue or epilogue to a play, a method of ingratiating one's self with the reader, bespeaking his indulgence or removing any unfavorable impressions with which he might begin the book; and was addressed to the "courteous reader" or the "gentle reader" (which properly meant an assumed *feminine* reader), etc. The *dedication*, in times

when there was no general book-market and an author must depend on the patronage of some person of rank (that is, down to the 18th century, and well into that), was an integral and indispensable part of the book: it meant that the author asked the patron to give him money and place in return for being celebrated, just as the old chiefs did their bards. He must have his Mæcenas; without him he would starve, with him he could disregard the masses. Sometimes, with men of hard, bold natures and a keen scent for the worst side of human life, like Martial or Aretino, they used disguised (very little disguised) threats and virtual blackmail as a supplement to appeal, and fawned and snarled alternately. In those times it was often nauseous with fulsome laudation; it is now of the simplest form, a mere survival used to express the author's liking or gratitude for some one, or acknowledgment of inspiration or encouragement, or in humorous books often a joke like the text.

Printers' Emblems.—These are the "book-plates" of the publishers, used not to imply ownership of the copies, but the credit of the work. They have been treated by Berjeu in 'Early Printers' (1866), by Silvestre in 'Marques Typographiques' (2 vols. 1867), and there was an old work of Roth-Scholtz (Nuremberg 1730); it has also been touched on by John Hill Burton in his 'Book-Hunter.' Among them may be cited the three-masted ship of Mathis van der Goes of Antwerp, 1472-94; the windmill of Andrew Myllar, Edinburgh, 1508 and later; the curious wild men and fruit-laden tree of Thomas Davidson of Edinburgh, in 1541; the Stephensens' olive-tree, and the Elzevirs' sphere. Often there is a punning allusion to the publisher's name: Froschover (*frosch* in German is frog) has frogs; Le Chandelier, a seven-branched candlestick; and Nicholas Eve has a picture of Eve giving Adam the forbidden fruit. Others use instead the armorial bearings of their cities; Leeu, the castle of Antwerp; R. Hall, Geneva's half-eagle and key on a shield; Stadelberger, the lion rampant of Heidelberg, and the diapered shield of Zurich. Ascensius, 1462-1532, has a most vividly accurate representation of his great printing press, with a pressman pulling a proof. His device bore the inscription, "Prelum Ascensianum"; and it was adopted by Jossé Bade of Paris, 1501-35, who added his initials at the foot; by De Gourmont, 1507-15; Le Preux, 1561-87; and in a modified form by De Marnef, 1567, and De Roigny, 1565. The Aldi had an anchor and a dolphin, which was employed by Turrison, De Chenney, Brillard, Tardif, and Coulombel—sometimes, as in Coulombel's case, with the divided Aldus.

Decoration.—Besides the illustration of the text by pictures, either as frontispiece or interleaved, there are certain artistic forms which are merely decorative accessories to the book as such. The title-page may have some of its lines or letters printed with colored inks; the printer's emblem or some suitable vignette may be inserted; or even the whole title may be engraved, as often in the 16th and 17th centuries, when it was frequently an exceedingly elaborate and costly affair, and in some modern *éditions de luxe* these engraved title-pages are works of extraordinary beauty. There are also ornamental initials, as with the illuminated manu-

scripts; head and tail pieces, in the blank at the head of a chapter or the space left at the end. The first printers often left the initial letters off altogether, or put in a small one as a guide to the artist, who inserted them by hand, using red ink, from which he was called a *rubricator*; he also used his taste in other decorative details, being in fact the illustrative artist of the time.

Technical Terms.—The sale and collection of books are too large subjects to be treated here, but a few of the names used in the second-hand book trade may be mentioned. "Unique," "rare," and "very rare," are intelligible as names, but need judgment in their acceptance. A book may be unique because it was not worth keeping, like disused text-books; the term does not imply any special value. Or it may be so because the original edition was limited to enhance its value, a very common device. In all such cases there must be knowledge and sense to estimate properly the intrinsic or factitious worth of the book. "Edition" means nothing whatever; properly it should mean all the issue of a book that the publisher thinks the market will bear at one time, and once it did mean that, but it has long ceased to have any definite connotation. As above, the "edition" may be artificially limited to a small number of copies with a promise to destroy the plate; on the other hand, a popular novel may sell many thousands and each thousand be called an "edition," so that it may be said to have passed through 50 "editions." "Thousand" is the honestest word, and is now more used by the large houses. "Curious" is a euphemism for a much less dainty word. "Foxed" means damaged by brown or yellow spots. "Uncut" does not mean that the leaves have not been opened with a paper-knife, but that the original size of the leaves has not been cropped by the binder. The French use *non coupé* for the former, and *non rogné* for the latter.

Book Club, a private association printing books for a limited number of subscribers. The members are usually learned men, and in this way render accessible rare books and manuscripts. The earliest of these clubs was the Roxburgh Club, whose work was not important. Other English clubs of this sort have done excellent and valuable work, among them the Camden Society, whose publications relate to English history, the Percy Society, the Hakluyt Society, and the Early English Text Society.

In America there were in Colonial and Revolutionary times a number of literary societies which published the writings of their own members; such was the Junto founded by Franklin. The first association established for the purpose of publishing was the 'Seventy-six Society' formed in 1854, whose publications relate to the American Revolution. This society existed for three years only, and was followed by "The Club" in New York, and by the Bradford Club. In 1858 The Prince Society of Boston was established, and it still continues its work of publication. From 1858 to 1876 a large number of clubs were formed whose work was neither important nor valuable. In 1876 the Brooklyn Historical Printing Club was established. It has done most excellent work on historical lines. The foremost of all American clubs of this sort is the Grolier Club of New York, formed in 1884 with 50 members, now numbering about

400. Its publications are of a literary and bibliographical character and are noted for their elaborate and artistic make-up.

Book-lice, wingless members of the family *Psocida*, order *Platyptera*. These minute insects would be easily mistaken for aphides, both the wingless as well as the winged individuals. Their bodies are oval, the head free from the prothorax, which is small and partially concealed by the unequal wings. The eggs are laid in patches on leaves, bark, or other objects, and are covered with a web. *Atropos divinatorius* is a small pale, louse-like insect, seen running over books and in insect cases, where it does considerable injury. It is one of the worst museum pests, especially injurious to the smaller lepidoptera. The same habit is also possessed by the well-known *Psocus domesticus*. Another species of atropos, probably *pulicarius*, has been found in Missouri, infesting the egg-mass of the cottony maple scale (*Pulvinaria innumerabilis*). See DEATH-TICK; DEATH-WATCH.

Book-scorpion, or **False-scorpion**, an arachnid animal of the family *Chernetidae*; known by its large maxillary palpi, like the scorpion's claw. The abdomen is 11-jointed, flattened, without any appendage, and the living forms are minute; they breathe by tracheæ. They are found running about dusty books and in dark places and feed on mites and Psoci. They are often found attached to the leg of some fly or other insect by which they are transported about. The female chelifer bears the eggs, 17 in number, in a little bunch under her abdomen. Meuge has observed a pseudo-scorpion cast its skin in a light web made for that purpose, where it remained five days in the web after its metamorphosis, and did not assume its dark colors for four weeks; three months after it returned to the same web for hibernation. Meuge describes eight species from the Prussian amber, belonging to genera still living, and Corda one (*Microlabris sternbergi*) from the coal formation in Bohemia, an inch long. Schiodte has found a curious blind species in the caves of Adelsburg, and several kinds occur in American caves. In chelifer there are no eyes. *C. cancrroides* is dark brown, with many short spines on the thorax.

Book-selling. See PUBLISHING.

Book-worm, the "book-worm" of librarians is probably the larva of a boring beetle (*Anobium paniceum*) one of the family *Ptinida*. These worms are small white grubs like those of weevils, which live in various drugs, dried meat, etc. It also burrows in hard biscuits, resulting in the weevily biscuits complained of on ship-board. It more commonly bores in old furniture, causing it to be "worm-eaten." These grubs become the beetles known as "death-ticks" or "death-watches" (q.v.). See the various works on entomology and Blade's 'Enemies of Books.'

Book of Days, The, a noted work edited by Robert Chambers, 1863. It has for its subtitle 'A Miscellany of Popular Antiquities in Connection with the Calendar.' In bringing it out the editor expressed a desire to preserve interest in what is "poetical, elevated, honest, and of good report, in the old national life"—recognizing the historical, and even the ethi-

cal, importance of keeping this active and progressive age in touch with obsolescent customs, manners, and traditions. Beginning with 1 January each day of the year has its own curious or appropriate selection, and its allowance of matters connected with the Church Calendar,—including the popular festivals, saints' days, and holidays,—with illustrations of Christian antiquities in general.

Book of the Dead, a compilation of the religious literature of Egypt in 106 chapters. According to Sayce's 'Ancient Empires of the East' (1884), it is a collection of inscriptions from the mummy cases, tombs, and demotic writings—the funeral ritual of the Egyptians, setting forth in mystical language, the adventures of the soul after death and the means of escaping torment. This is also the title of a volume of poems by George Henry Boker (1882).

Book of Martyrs, The, a famous work by John Foxe, sometimes known as the 'History of the Acts and Monuments of the Church,' first published in Latin in 1554, when the author was in exile in Holland. The first English edition appeared in 1563. By order of the Anglican Convocation meeting in 1571, the book was placed in the hall of every episcopal palace in England. Before Foxe's death in 1587 it had gone through four editions. From the persecutions of the early Church, the author passes to those of the Waldenses and Albigenses, from these to the Inquisition, and from the Inquisition to the persecutions under Mary Tudor.

Book of Mormon, a collection of 16 distinct books professing to be written at different periods by successive prophets. Its style is an exceedingly clumsy and verbose imitation of that of the common English translation of the Bible, portions of which, to the number in all of 300 passages, are incorporated without acknowledgment. It constitutes the scriptures of the members of the Church of Jesus Christ of Latter-Day Saints. Joseph Smith, an American, of Manchester, N. Y., professed to have heard in 1823 the Angel Moroni reveal to him in visions that the Bible of the Western Continent was buried in a box near his residence. This, according to his own account, he at length found—a volume six inches thick, with leaves of thin gold plate, eight inches long by seven broad, bound together with three gold rings; on which leaves was a mystic writing that he characterized as reformed Egyptian. With the book he professed to have found a pair of magic spectacles, by means of which he was able to read the contents, which he dictated to an amanuensis. This book consists of an alleged history of America from 600 B.C., when Lehi and his family (descended from the dispersion after the building of the Babel tower) landed in Chile. Between the descendants of Nephi, Lehi's youngest son, and the offspring of his older brothers, who are the North American Indians, long conflicts waged; the Nephites finally being almost annihilated. There remained a fragment, among whom were Mormon and his son, Moroni. They collected the records of their people, and buried them in the hill of Cumorah, on the Divine assurance that they would be found by the Lord's prophet. Besides this history, the book, as it finally was received, has various moral and religious teachings. The real

history of it is as follows: Solomon Spalding, an eccentric Presbyterian preacher, wrote a historical romance in 1809, which a compositor, into whose hands it fell, sold to Smith. This was, in substance, the 'Book of Mormon,' which Smith issued, and to which various additions have since been made. See MORMON.

Book of Nonsense, A, a nursery classic by Edward Lear. It is made up from four minor collections published at intervals during a long life. The author began as an artist; colored drawings for serious purposes were supplemented by others for the amusement of the groups of little ones he loved to gather around him; and the text added to them has proved able to endure the test of time without the aid of drawing, and much of it has become part of the recognized humorous literature of the language.

Book of Snobs, The, a series of sketches by William Makepeace Thackeray. It appeared first in 'Punch,' and was published in book form in 1848. The idea of the work may have been suggested to Thackeray when, as an undergraduate at Cambridge in 1829, he contributed to a little weekly periodical called the *Snob*.

Bookbinding, the art of arranging and making up the sheets of a book into a volume. The first operation in bookbinding is to fold the sheets. If the book be folio, each sheet is folded into 2 leaves; if quarto, into 4 leaves; octavo, 8 leaves; 12mo, 12 leaves; 18mo, 18 leaves; and so of all others, to 72mo, the smallest size in general use. The first page of each sheet of all English books has, at the bottom, a letter of the alphabet, or a number, the letters or figures forming a consecutive series. These marks, technically denominated signatures, direct the workmen in the proper arrangement of the sheets. After the sheets are folded, they are arranged in the proper order. The book is then beat on a large smooth stone with a heavy hammer, or put through a rolling machine, to make it smooth and solid; care must be taken in beating or rolling it to prevent setting off the printing of the one page on the other, which may happen if the ink is not perfectly dry. After beating, the book is separated into three or four portions, and put between smooth hardwood boards, and pressed in a screw or hydraulic press for several hours. It is then carefully collated according to the letter or number at the bottom of the sheet, and sawed on the back, in three or five places, according to the size of the work, in order to admit the cords on which it is to be sewed. When a book has been sewed, it is then secured by a coating on the back of strong glue, care being taken that the sheets be accurately adjusted at the head and back. When the glue has dried, the back is rounded with a hammer, the same as those used by shoemakers; it is then screwed up very tight in the cutting press, between hardwood boards, half the breadth of the book, and thinner on the one edge than the other; the boards being kept an eighth of an inch from the edge of the back. The back of the book is now beat smooth, and the edge of the back being beat on the edge of the boards that compress it, a groove is formed for the pasteboard to rest in. The pasteboards are then laced to the book by the ends of the cords on which it is sewed; after the lacing the superfluous parts are cut away, and the rest hammered smooth. The book is then pressed again for

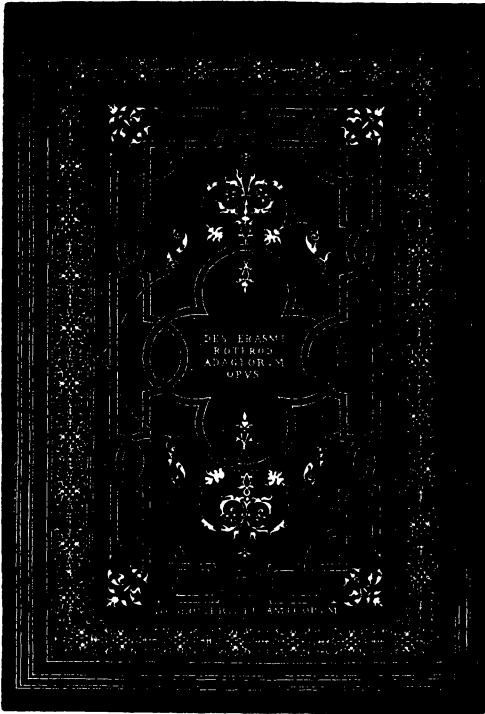
several hours, to make it solid for cutting, which is performed by a machine called a plough. The boards ought always to be cut one fourth inch longer and one eighth inch broader than the book. The part of the board that projects is called the squares, and is a protection to the book.

When the book is cut, it may either be gilt, marbled (see MARBLING), or sprinkled on the edges, or left white, as all law-books are. In order to be gilt, the book is screwed hard up in the cutting press, between two cutting boards, and scraped perfectly smooth with a small circular piece of steel, having a sharp edge all round. It is now burnished with a dog's tooth or agate burnisher; a solution of the white of egg and water being spread over with a sponge; and the gold is laid on with a piece of paper in the ordinary way. After having dried for about 20 minutes, the gold is then burnished.

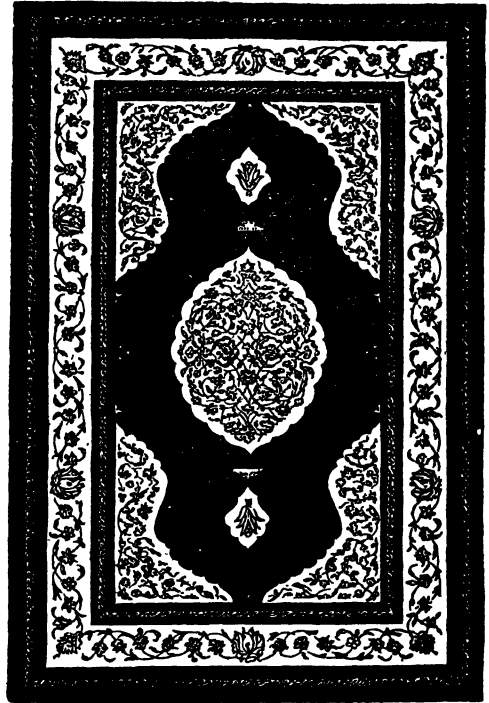
Sprinkling the edges of a book is performed with a brush. Holding the brush in the right hand, and a bar of iron in the left, the workman dips the brush in the requisite solution, and having beat the brush on a bar till the color is nearly out, the residuum falls fine, and produces the desired effect. The edges of sprinkled books are either burnished or not, at pleasure. The usual compositions for sprinkling are a solution of umber, vermilion, sap-green, or indigo.

The head-band is now added, which is an ornament made of cotton cloth, thread, or silk, of two or three colors, placed at top and bottom of the book, across the leaves, and woven or twisted about a strip of vellum the width of the square. When the book is head-banded, it receives on the back another coat of strong glue; on the top of the glue is laid a piece of cartridge paper the size of the back, and rubbed smooth with a folder. The book is now ready for the leather cover. The cover, after being damped with a sponge and water, and having the edges pared thin on a marble stone, and the rough side smeared with strong paste made of flour, is now pulled on, and doubled over the edges of the boards. The sides and edges are then neatly squared and smoothed, and the bands at the back raised by working the cover with a bone paper-knife, the white or colored lining papers are inserted, and the book is put for some hours into the press, after which it is ready for its ornaments and letters. The letters or ornaments on books are made with brass tools engraved in relief. Those parts of the leather on which gold is to be applied are glazed over two or three times with glair, each coating being allowed to dry before another is applied. When dry, the cover is slightly rubbed over with oil or hog's lard, and the gold laid on; the brass tools, after being heated to about 200° F. are then impressed; the superfluous gold-leaf is rubbed off with a piece of cotton cloth. An iron tool, called the polisher, heated as above, is then applied, and the book, after being pressed for four or five hours in smooth japanned plates is considered finished. Leather covers are also often used in which a pattern is previously embossed by means of a powerful fly-press acting on a metal die. The metal die rests on the lower bed of the press, and to the upper bed is attached a counter-die or millboard, which has received its impression from the metal die. Between the two the leather is embossed in an instant.

BOOK-BINDINGS.



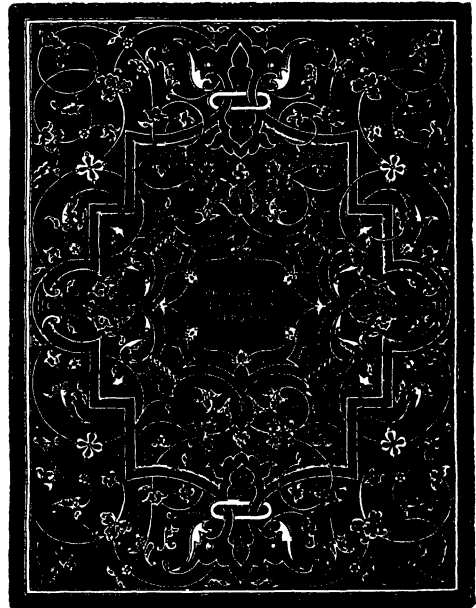
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2



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4

1. Grolier Binding; Italian Renaissance. About 1530.
2. Persian Binding of the Koran. About middle of 17th Century.
3. Binding by Geoffrey Tory; French Renaissance
4. Binding by Majoli; Italian Renaissance. About 1520

BOOKKEEPING

The foregoing description applies chiefly to the binding of books in leather, and in the strongest manner; but an immense number of books are now bound entirely in cloth, a style of binding which, though less strong, is cheaper and more expeditious. In this case the book is very often left uncut, the projecting side and bottom edges being merely trimmed a little with a large knife without the folds of the paper being cut. The rounding of the back is now commonly effected by means of a machine for the purpose, instead of by the hammer. The cloth covers or "cases" are made up complete—embossed, gilt, and lettered—before being attached to the book, the ornaments being stamped upon them by presses not very different, except in power, from the fly-press for embossing leather. The covers are attached to the books by means of strips of coarse thin canvas, which are glued to the backs of the books, and which project one half or three fourths inch on each side. These projecting strips are glued to the boards, and to conceal this arrangement, and give a neat finish to the book, some white or colored lining paper is glued in. The books are then pressed for a few hours, and may now be said to be finished. So rapidly can books be done up in cloth, that in a large establishment as many as, say, 1,000 copies of an octavo book can be finished in about six hours. Another method of binding, which dispenses with the processes of sewing, gluing, and rounding, is now commonly practised in the case of engravings, atlases, manuscripts, etc., which are either in single leaves, or have little or no margin left for stitching. This method consists in smearing the back of the book, while placed in the press, with a solution of caoutchouc, by which means each paper edge receives a little of this tenacious substance, and all are firmly kept in their places. Such books open up quite flat at once.

No remains of ancient binding, before the art of printing, have been transmitted to our time. After the invention of printing, books were variously decorated in binding. Strength and durability appear to have been the first objects of attention. Sometimes the books were covered with velvet, but most commonly the covers were of wood, planed to a suitable thickness, over which leather or parchment was fastened. Sometimes brass ornaments were affixed to the sides, and pieces of brass were put on the corners of the books with the view of increasing their durability. Some of the most valuable books were covered with clear vellum, then overlaid with gold-leaf, and ornamented with various devices. Not unfrequently the year in which the book was bound appeared in large figures on the cover. In England the monks and students in monasteries were anciently the binders of books. Of their ingenuity and skill the various missals and other works preserved in our public and private libraries furnish abundant evidence.

Bookkeeping is the recording of the transactions of a business so that the resources and liabilities may be readily exhibited. Transactions are recorded in the order of their occurrence in such books of original entry as may be imposed by the nature of each business or which conform to the requirements of the accounting system in use. If but a single book is used for this purpose, its form is usually that of the

day-book, which contains a narrative of all the transactions as they occur. Formerly this was the general procedure, but it is found that business can be expedited by classifying the transactions in separate books, consequently the cash-book, purchase-book, and sales-book are now commonly used concurrently. Whatever may be the character and extent of the original records, the transactions are ultimately transferred in classified form to the ledger, which is the principal book of accounts. There are two systems of bookkeeping in use, namely, single and double entry. The primary element in each of the two systems is the Account. In bookkeeping by single entry only accounts with persons are kept in the ledger, and the profits and losses are ascertained solely by comparison of past with present conditions; in other words, by taking the difference between the net worth at the beginning and the net worth at the close of a stated period. The principal books used in single entry are the day-book, cash-book, and ledger. Being a simple though necessarily imperfect method, single entry is used chiefly by retail traders. Bookkeeping by double entry, as the term implies, is that mode in which every transaction is entered twice, first on the debtor side of one or more accounts, and next on the creditor side, thereby keeping the ledger perpetually in balance. The chief objects of keeping accounts, it may be stated, are to determine (1) the amount of profit or loss during a definite period, and (2) the amount of net capital or net insolvency at the end of such period. The system of double entry gives the net capital or net insolvency in two different ways, from two different sources, the one corroborating the other, and constituting what is called the balance of the books. Upon the classification resulting from this arrangement rests the claim of double entry bookkeeping to be considered as a science.

Bookkeeping, like most other sciences, has adopted a terminology of its own to avoid circumlocution. For example, the terms debtor and creditor, usually abbreviated Dr. and Cr., are used arbitrarily to designate the right-hand and left-hand side, respectively, of an account. An account is a collection of items, under an appropriate title, so arranged as to give a result by comparison.

Journalizing is the mental process of deciding how every transaction is to be disposed of in the ledger; that is, what accounts are to be debited and credited in each case. Posting is the transferring of debit and credit items to their proper accounts in the ledger. A trial balance is a list of the open accounts in a ledger together with the debit and credit footing of each account. A business statement is a summarized exhibit of those accounts which comprise all items of revenue, otherwise denominated a profit and loss account. A financial statement is a compilation of those accounts having to do with capital, in other words, a balance sheet. A balance sheet is a condensed statement of the resources and liabilities of a business. It is usually compiled from the trial balance and inventory schedules at the end of a fiscal period and it is frequently accompanied with a profit and loss statement which confirms the increase or diminution of finance as displayed in the balance sheet proper. The function of a balance sheet is,

BOOKKEEPING

therefore, to present a scientific statement of the financial condition of a business at a specified date.

The problem presented in bookkeeping, as may be inferred from the foregoing, is that of exhibiting financial transactions as they occur in the most minute detail, and ultimately in the most condensed form. The best solution of this problem in any given instance, depends largely upon the nature of the individual business the operations of which are to be recorded.

The advantages of the double entry system over the single entry system may be summarized briefly as follows: (1) The susceptibility of infinite modification in its minor features without disturbing the general results as shown in the balance sheet; (2) the constant equilibrium of debits and credits, the mathematical proof of which is afforded in the trial balance; (3) the separate classification of capital and revenue accounts, the resultant statement of each class being confirmatory of the accuracy of the other; (4) the displaying of the channels through which profit and loss items have accrued, thus revealing the methods by which the movements of the business have been financed; (5) the provision for the ascertainment of gross profit on the different departments of a business by means of the trading accounts; (6) the working economy resulting from the introduction of special columns in the books of original entry; and (7) the ease with which a thorough audit can be conducted at any time, this circumstance serving as a check upon erroneous entries.

A double-entry ledger, as before stated, is the book of accounts. As such it is a concrete expression of the principle of classification, and the philosophic basis of the "science of accounts" is displayed therein with mathematical precision. Each separate account contained in the ledger is built up on the theory of comparison. Thus, the items of one side denote increase or plus of financial ability, those of the other side denote its decrease or minus. Hence, to know the proper place in the ledger in which to assign each item in a transaction, is to know the laws, principles, and objects of each account in the ledger; and a false entry can only be proved false by showing its want of conformity to some principle of the ledger. Take the cash account for illustration: The left-hand or debit side contains the items of cash received; and the right-hand or credit side the items of cash disbursed; the difference between the receipts and payments will, necessarily, be the balance or amount of cash on hand, which, in this case, can be confirmed by actual count. Again, the merchandise account shows on the debit side the value of the goods on hand at the beginning and the cost of all subsequent purchases; the credit side shows all returns or sales of such goods, to which is added the value of the goods on hand at the end; the difference or balance, being the excess of production over cost, or of cost over production, as the case may be—in other words, the gain or loss. Each separate account, therefore, is constructed in accordance with a fixed and unalterable plan and each contributes a definite result which must be considered in the final showing. Being based upon the theory of the equation, there follows a double record of each item in every account with the result that the total debits always equal the total credits when the several accounts are taken

together. It should be noted in this connection that finance, only, is the essential object of accounts, namely, cash, notes, book debts, or their equivalents; any other property is only introduced into the books to show how far it contributed to the increase, or occasioned the diminution of finance, and so to corroborate the actual amount of financial ability found to exist. The great and almost the only source of confusion in double entry is that of confounding an account kept to show financial ability with an account to ascertain how much the profit on some property dealt in has contributed to whatever augmentation may be found in the state of the finances after a certain period of business.

It will be apparent that two distinct ideas are concurrently promulgated through all movements of the business directed toward an increase of wealth. These two ideas are concentrated in the cash and merchandise accounts, respectively, as types of the two classes of accounts. These two classes of accounts have been denominated, business and financial: the former revealing the movements of the business, the latter its financial results. In other words, business accounts show the losses and gains, and financial accounts show the resources and liabilities. Thus it will appear that the debits of the financial accounts show an increase of wealth and the credits decrease, and that the business accounts simply show the same thing reversed. Accordingly, the sum of all the resources of a concern less the sum of all its liabilities is its net capital. All increase or diminution of net capital comes from the receiving of more or less for property than its cost or the appreciation or depreciation of property while in possession, or from rent, interest, taxes, and service. The net gain or net loss of a concern, therefore, during any specified period must be exactly equal to the increase or decrease of net capital during the same period. In a manufacturing concern, for example, it is important that the progress of the business be shown at frequent intervals. It should be possible at any time to ascertain the cost of production of each article manufactured and to verify this cost by a statistical comparison with previous costs. This implies (1) that such a system of stock-keeping be inaugurated as shall show the amount of material consumed in the process of manufacture; (2) that the expenditures for labor be shown for each of the successive steps essential to bringing the article to a completed condition; (3) that costs of superintendence and incidental shop charges be pro-rated; (4) that the general expenses be distributed among the goods manufactured; (5) that adequate provision be made for depreciation; (6) that specific reserves be set aside for bad debts, taxes, contingencies, etc., and (7) that final profit shall be based on the total inclusive cost of production. The application of scientific principles to the accounting system should enable the management to have placed periodically before it, such facts relating to the cost of production as are essential to the shaping of a successful policy in these times of intense industrial competition.

The manner of recording transactions before they are arranged in the ledger, varies in almost every business, but this variation presents no confusion whatever when the different accounts embodied in the ledger are thoroughly under-

BOOKKEEPING

stood. Double-entry accounting, in fact, admits of a great variety of modifications, erroneously, in many cases, called systems. The so-called voucher system, for instance, now extensively used in railway and manufacturing corporations, is an expedient for eliminating from the ledger individual accounts with creditors. At the same time, by the device of special columns in a voucher register, it facilitates the most minute subdivision of revenue expenditures and renders periodic comparison of such items possible to any degree desired. In most lines of business special columns may also be introduced in the cash-book, sales-book, and journal for the purpose of minimizing the mechanical labor of posting, the aggregate of each column being transferred to the corresponding ledger accounts instead of the separate items. The principle of consolidated postings is applied in dividing the accounts of the general ledger among a series of subordinate ledgers, a com-

Loose leaf and card ledgers, impression sales-books, duplicate order blanks, and the many mechanical devices for the curtailing of labor or the securing of expediency or directness in recording, do not come within the limits of this discussion which is intended rather to give a general view of the subject and its underlying principles.

Auditing.—Broadly stated, it is the province of the accountant to devise the accounting system and to specify the nature and character of the records that shall be kept; it is the duty of the bookkeeper to perform the routine work of recording the transactions of the business in accordance with the plan outlined by the accountant; it is the function of the auditor to examine critically the completed records of the bookkeeper, to compare the entries with the documents, to ascertain if the plans of the accountant have been strictly followed, and, finally, to prepare the profit and loss account and certify

FORM OF DAY BOOK.

New York, July 1, 1903.

Joseph Hardcastle began business this day with the following resources and liabilities:					
Cash on hand,		6000			
Bills receivable, note signed by B. F. Williams,		4000			
Elston E. Gaylord owes him on account,		2500			
Stock of goods on hand at present value,		5000			
Total resources,			40	17500	40
Bills payable, for note favor Charles W. Haskins,		8400			
Leonard H. Conant for amount owed him on account,		2850			
Total liabilities,				11250	
Joseph Hardcastle's net capital,				6250	40
2					
Bought of Henry R. M. Cook on account					
200 bush. potatoes @ \$1.10,				220	
3					
Received cash for B. F. Williams' note now due,				4000	
4					
Sold Edgar M. Barber on account at 30 days,					
60 bbls. apples @ \$3.50,			210		
400 bush. corn @ 80c.,			320	530	
5					
Received from Elston E. Gaylord, cash in full of account,				2500	
6					
Lent O. P. Kinsey, cash, receiving his note at 90 days					
with interest at five per cent,				1000	

mon division being: general, sales, and purchase ledgers. Each of these ledgers can be made self-balancing, if desired, by means of special columns in the books of original entry, a controlling account being kept in the general ledger, representing the aggregate sums in each of the subordinate ledgers. A separate ledger can thus be appropriated, if the magnitude of the business demands it, to the names beginning with each letter of the alphabet, or any number of letters may be included in one, as A to K, A to G, etc. By this means separate duties may be assigned by the accountant to a large number of subordinates, the general ledger consisting of but few accounts, from which, however, he is enabled to show promptly the condition of the entire business. A private ledger is kept by some proprietors for the purpose of withholding from subordinates certain information. The difference between the total debits and credits of the private ledger accounts should complete and confirm the general trial balance. Capital, profit and loss, investments, and other accounts can be kept in this manner with perfect security.

to the correctness of the balance sheet. It is incumbent upon the auditor to exercise every faculty and means in his power to determine (1) that the liabilities are all stated; (2) that the resources are not overstated; (3) that the profit and loss account contains all expenses chargeable to the period under review; (4) that the profits earned are all included; (5) that proper charges against revenue have not been capitalized; and (6) that intentional errors, irregularities, and fraudulent entries have not been permitted. The professional duties of the competent public accountant and auditor, therefore, cover a wide range of technical knowledge and commercial experience. A large number of text-books on elementary bookkeeping have been published, principally for schoolroom instruction. For a broader treatment of the subject application for special reference books may be made to members of the State Societies of Certified Public Accountants and the American Association of Public Accountants, or the following works may be consulted: Lisle, 'Accounting in Theory and Practice'; Dicksee, 'Auditing'; Broaker, 'American Accountants' Manual';

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Dawson, 'Accountants' Compendium'; 'American Business and Accounting Encyclopædia'; Gottsberger, 'Accountants' Guide for Executors'; Arnold, 'Complete Cost Keeper'; Miller, 'Cost Accounts'; Keister, 'Corporation Accounting and Auditing'; Metcalf, 'Cost of Manufactures'; Lewis, 'Commercial Organization of Factories'; Matheson, 'Depreciation of Factories'; Whinney, 'Executorship Accounts'; Garcke & Fells, 'Factory Accounts'; Norton and Feasey, 'Newspaper Accounts'; Soule, 'New Science and Practice of Accounts'; Fischer, 'Railway Accounts and Finance'; Norton, 'Textile Manufacturers' Bookkeeping.' It is proper to state that in the preparation of this article the undersigned is also indebted to the writings of Mr. Thomas Jones and to suggestions from Prof. Joseph Hardcastle, two of the ablest writers on accounting that America has produced.

EDGAR M. BARBER.

FORM OF JOURNAL. New York, July 1, 1903.

L.F.							
2	Cash,		6000				
3	Bills receivable,		4000				
9	Elston E. Gaylord,		2500				
5	Merchandise,		5000	40			
15		Bills payable,				8400	
12		Leonard H. Conant,				2850	
1		Joseph Hardcastle,				6250	40
		2					
5	Merchandise,		220				
11		Henry R. M. Cook,				220	
		3					
2	Cash,		4000				
3	Bills receivable,					4000	
		4					
12	Edgar M. Barber,		530				
5	Merchandise,					530	
		5					
2	Cash,		2500				
9		Elston E. Gaylord,				2500	
		6					
3	Bills receivable,		1000				
2		Cash,				1000	

FORM OF CASH BOOK (DEBIT SIDE).

1903 July							
1	Balance on hand,					16428	42
2	Merchandise, cash sales,						
6	Bills receivable, A. C. Lobeck's note,	5	450	65			
9	Herbert H. Swasey, on account,	3	3500				
15	Bills receivable, M. A. Bigelow's note,	10	4000				
15	Interest on above	3	692	48			
20	James G. Cannon, on account,	7	7	20			
25	Merchandise, cash sales,	11	1200				
28	Lyman J. Gage, on account,	5	1570	83			
		16	230	09			
	Cash Dr.,	2				11651	25
						28079	67

FORM OF CASH BOOK (CREDIT SIDE).

1903 July							
4	Merchandise, Invoice No. 45, Garner & Co.,	5	12000				
7	Bills payable, note favor W. F. Wakeman,	15	1740				
8	John L. N. Hunt, on account	12	1235	75			
10	Expense, cartage,	4	14	50			
16	Bills payable, acceptance Charles E. Sprague,	15	2000				
16	Interest on above, 30 days,	7	10				
	Cash Cr.,	2				17000	25
	Balance,					11079	42
						28079	67

FORM OF LEDGER ACCOUNT.

Dr.					C.r.				
1903 July	1	On hand,			1903 July	4	W. J. Kinsley,	18	2764
	12	Chas. H. Parkhurst,	31	5000		16	Note at 30 days,	24	6041
	31	Profit and Loss	10	8471		31	Inventory.		5640
				974					14446
				14446					15

BOOK-PLATE

FORM OF BALANCE SHEET. — COMPANY JULY 1, 1903.

<i>Resources.</i>	\$	\$	<i>Liabilities.</i>	\$	\$
Cash on hand,			Mortgages payable,		
Cash in bank,			Interest due and accrued,		
Stocks and bonds, as per Schedule A,			Sundry trade creditors as under:		
Properties as under:			Bills payable		
Land, per Ledger valuations,			as per Schedule D,		
Buildings, per Ledger valuations,			Accounts payable		
Plant and machinery, less deprecia-			as per Schedule E,		
tion,			Capital stock,		
Inventory of stock, valued by Mr. —			Reserve for —		
as under:			Surplus,		
Raw material,					
Goods unfinished,					
Goods manufactured,					
Sundry trade debtors as under:					
Bills receivable as per Schedule B,					
Accounts receivable,					
as per Schedule C,					
Less reserve for discounts,					
Prepaid charges as under:					
Insurance premiums,					
Rent for July, 1903,					

Book-plate, a printed or engraved label, usually decorative, placed on the inside cover of a book as the owner's symbol. In a certain sense, any individualized label is entitled to the name; but as usually understood, the term is restricted to those with some special artistic design, which, however, may range from the simplest to the most elaborate and ornate composition. The elements are—the owner's name; his coat of arms if he has one, usually, but not invariably; allegorical emblems or compositions; landscape designs; mottoes; quotations, etc. In purpose they are probably very ancient: some of the small tablets found in Assyrian libraries are intelligible only as book-plates, and they are accredited to Japan in the 10th century. Indeed, something of the sort may almost be predicated of any society where books circulate much. But our modern book-plates are of German descent, and seem to have been nearly contemporaneous with printing, one being mentioned as of the mid-15th century; the earliest actually known, however, is a hand-colored heraldic wood-cut of about 1480, in some books and manuscripts presented to the monastery of Buxheim, Swabia. The earlier ones were all mere indices of ownership, rough wood-cuts with no artistic design; they were permanently raised into the domain of an art by the great Albrecht Dürer (1471-1528), the "father of the book-plate." He made two for Bilibald Pirckheimer, probably before 1503—one a mixture of armorial and allegorical elements, and the other a large bold portrait of the famous Nuremberg senator; but his earliest dated one is for Hieronymus Ebner of the same city, in 1516. Several of the great German artists of that age—Holbein, Cranach, Amman, and others—designed book-plates; indeed, since Dürer's time the best have not disdained this branch of art, and wealthy collectors have vied with each other in costly designs.

The idea was soon adopted in other European countries. The French wrought with great delicacy and beauty, but with too elaborate and profuse decoration. The English were very late in adopting the fashion: the number of examples which have come down from before the Restoration is singularly few, and the first engraved one we possess is that of Sir Nicholas Bacon, father of the Chancellor, dated 1574; though an old folio volume from Henry VIII.'s library, now in the British Museum, contains

an elaborately emblazoned drawing which formed the book-plate of Cardinal Wolsey, with his arms, supporters, and cardinal's hat. But after the Restoration they multiply so rapidly that owing to the great number of wealthy English collectors, they far outnumber all the rest of the world, and some of them have considerable historical interest. Pepys had several, one with initials and crossed anchors probably as early as 1668, one with his portrait not earlier than 1685. Among other English names highly prized by book-plate collectors may be mentioned Bishop Burnet, William Penn, Robert Harley, Matthew Prior, Lawrence Sterne, David Garrick, Horace Walpole, John Wilkes, and Charles James Fox. Among the artists who have engraved them are those of William Marshall and Robert White, Hogarth, Bartolozzi, Bewick, and Vertue. Bewick at one time was regularly employed in their production. One of the prettiest of book-plates is that designed in 1793 by Agnes Berry for the Hon. Mrs. Damer, and engraved by Francis Legat

The style of design, naturally, has varied with the taste of the age, and is no mean index of its characteristics. The chief English styles have been classified by Lord de Tabley, the leading modern authority, as follows: Early English, entirely armorial, with profuse mantling, and large full-rounded curves surrounding three and often four sides of the shield. Jacobean, from about the time of James II. to 1745, with a heavy carved appearance, an even balance of proportions, always a regular outline, and often a carved molding around it which makes a massive rectangular frame—a dignified and reposeful if rather formal style. The Chippendale succeeded, lighter and more graceful, with rich curves and airy scrolls, the helmet gone, no set form of shield, and a profusion of careless sprays and garlands, etc. This degenerated with poor artists into an incongruous mass of overdone and rococo ornamentation, a heap of all the unrelated objects of nature and art and the most artificial frivolities of design, portraits, and castles, and ruined abbeys, Watteau shepherdesses and shepherds, lambs and dragons, dogs and ships, etc. About 1770 came in the Ribbon and Wreath, with a shield decorated as the name implies, much simpler and more tasteful.

The American settlers for more than a century made no attempt at book-plates of their

own manufacture: the richer colonists looked to England for everything, especially luxuries and articles of culture, and the others had no time or taste for superfluities. Naturally enough, most of these early plates belong in the southern colonies, where there was more of leisure and cultivation of the decorative side of life; but for the same reason, their more intimate connection with England and preference for its ways, as well as superior taste, they continued to use its book-plates almost exclusively long after American engravers were actively employed upon this branch of work. Very few of the old southern plates are of American design, and consequently they are much less valued by collectors (except for the owner's sake, as with Washington's) than the northern; though the latter are much cruder in heraldry, design, and execution. The earliest dated and signed American plate by a native engraver is that of Thomas Dering, engraved in 1740 by Nathaniel Hurd of Boston; the next is of John Burnet (1754), by Henry Dawkins, who settled in 1730-77, the best of our early engravers, though there is no doubt that an earlier one of Hurd's was that of Edward Augustus Holyoke; Philadelphia and later in New York; then comes that of Benjamin Greene (1757), by Hurd; then of the Albany Society Library (1759). Paul Revere also engraved book-plates; as did Amos Doolittle of New Haven, Peter Maverick of New York, Alexander Anderson of New York (the first American wood engraver, sometimes called the "American Bewick"), and others, in the northern States, especially around the great centres like Boston, New Haven, Philadelphia, and Baltimore. They worked mainly in the Chippendale style till it gave place to the Ribbon and Wreath, and originated no new style.

The earliest book-plates were of large size, as if made specially for folios; but a smaller size soon became general, and was used for books of all sizes. Some owners, however, have used different plates for different sizes; some of Sir William Stirling-Maxwell's were of gigantic proportions.

The collection of book-plates is a very modern amusement, but has risen to enormous proportions. The first collector known was Dr. Joseph Jackson Howard, and his collection numbered over 100,000. Sir Augustus Wollaston Franks of London had one of some 200,000, which he left to the British Museum. A German nobleman, Count Karl Emich zu Leiningen-Westerburg, had also an exceedingly fine one. A number of large and valuable ones exist in the United States, including that of the Grolier Club, which gave in 1894 the first American public exhibition of them. There is a cosmopolite association of collectors and connoisseurs, the *Ex Libris Society* of London (1890), issuing a monthly journal, and there are also periodicals devoted to it in France and Germany. There are regular "prices current" of book-plates among dealers, and auction sales as of books. The intelligent study of them is based on the work of the English poet John Byrne Leicester Warren, afterward Lord de Tabley, who published, in 1880, his 'Guide to the Study of Book-Plates,' which has no rival, and whose classifications are universally accepted. Special works on particular divisions, besides works in foreign languages, are, among

others, Castle's 'English Book-Plates' (1892); Hamilton's 'French Book-Plates' (1892); Hardy's 'Book-Plates' (1893); C. D. Allen's 'American Book-Plates' (1894), Labouchere's 'Ladies' Book-Plates' (1895); Hamilton's 'Dated Book-Plates' (1896); etc.

Books, Censorship of. Unless we consider the burning of condemned books under the Roman emperors as a censorship, the establishment of this institution must be attributed to the popes; but it cannot be denied that it would have sprung up in a thousand other places even if it had not existed in their dominions. Soon after the invention of printing, the popes perceived the influence which this art exerted over the diffusion of knowledge. It was besides doubly dangerous at a time when the authority of the Church had been assailed, and was shaking under the load of its abuses. They endeavored therefore to prohibit first the reading, and secondly the printing, of certain literary works. They enforced the ancient decrees of the Church against the reading of heretical books, and introduced an ecclesiastical superintendency of the press in 1479 and 1496, more completely established by a bull of Leo X. in 1515. In this the bishops and inquisitors were required to examine all works before they were printed, and thus to prevent the publication of heretical opinions. They went still farther: as this papal decree could not be carried into execution in all countries on account of the Reformation, they prepared an index of books which nobody was allowed to read under penalty of the censure of the Church. This index was commenced by the Council of Trent, in the fourth session of which (1546) the decree of the censorship was renewed; but it was not executed, and was finally left to the popes (25th session of 1563), by whom several such (*Indices Librorum Prohibitorum*) have been published. Works of an established character, which could not well be prohibited, it was determined to expurgate. The Duke of Alva caused such an 'Index Expurgatorius' to be prepared in the Netherlands; another was drawn up at Rome in 1607; but there are serious difficulties in expurgating books. The papal government still continues the policy of prohibiting to the faithful the reading of works deemed dangerous, and the Congregation of the Index has still its place and functions at Rome.

In Germany the politico-theological controversies gave the first occasion for the introduction of this institution, as they were carried on with the greatest violence on both sides. The decree of the German diet in 1524 prohibited them. By the diet of 1530 a more severe superintendence of the press was established; and this was confirmed by later laws of the empire in 1541, 1548, 1567, and 1577, etc. It was also provided at the Peace of Westphalia, 1648 (*Osnabr. Instr., cap. v. sec. 50*), that the states should not suffer attacks on religious parties. From that time the emperors have promised, in their elective capitulations, to watch strictly over the fulfilment of this article. In the capitulations of the Emperor Leopold II., 1790, and of the Emperor Francis II., it was further added (*art. vi. sec. 8*), "that no work should be printed which could not be reconciled with the symbolical books of both Catholics and Protestants, and with good morals, or which

might produce the ruin of the existing constitution, or the disturbance of public peace." It was, however, not difficult in most Protestant countries for individual authors or literary journals to obtain an exemption from the censorship; and many institutions, academies, universities, etc., were privileged in this way as far as concerned their regular professors. The governments sometimes protected their subjects with great energy; as, for instance, that of Hanover, in the case of Putter and Schloetzer. Censorship was first abolished in England. It was formerly exercised by the well-known Star-chamber, and, after the abolition of this court in 1641, by the Parliament. In 1662 it was regulated by a particular statute, but only for a certain number of years. This statute was renewed in 1679, and again in 1692 for two years more. In 1694 the right of the crown to render the printing of writings, journals, etc., dependent on its permission,—that is, the censorship,—ceased entirely. In Holland, and even in the Austrian Netherlands, a great liberty, if not an entire freedom of the press, prevailed. All that was not permitted to be printed in France appeared in the Netherlands or in Switzerland, at Lausanne and Geneva, to the great advantage of the Dutch and Swiss book-trade.

In Sweden, by an edict of 1766, and accordingly under the aristocratical constitution, the abolition of the censorship was ordered; yet Gustavus III., personally a friend to the liberty of the press, was obliged to retain the censorship, and even to execute it with severity, during the aristocratical machinations which disturbed his reign, and which were but imperfectly counteracted in the Revolution of 1771. Gustavus IV. issued an edict soon after he ascended the throne, by which the censorship was retained only in matters of religion, and was administered by the consistories. This, however, was not permanent; at first penalties were enacted, and in 1802 the censorship was entirely re-established, committed to the chancellor of the court, and executed with severity. French and German books were prohibited. King Charles XIII., immediately after his ascension to the throne, abolished it entirely by a provisional order of 12 April 1809, which was confirmed as an article of the constitution (sec. 86), 6 June 1809. In Denmark, by a royal rescript of 14 Sept. 1770 (under the minister Struensee), the censorship was wholly abolished; neither has it been restored, though the laws by which the liberty of the press has been regulated have been changing, and have sometimes been very oppressive. In France the censorship, which had belonged to the department of the chancellor and been administered by royal censors, was annihilated by the revolution. All the constitutions, from 1791 to the Charte Constitutionnelle in 1814, declare the liberty of the press one of the fundamental laws. During the republic there was no censorship, but the revolutionary tribunals took its place. Napoleon restored it in another form by the decree of 5 Feb. 1810 (Direction de l'Imprimerie). Since the Restoration it has also undergone various changes. Books of more than 20 sheets have always remained free, but the censorship has been exercised over pamphlets and journals at different periods. Under the government of the Emperor Napoleon III. the censorship was

re-established with new penalties, and is still maintained.

In the kingdom of the Netherlands the censorship was abolished by a fundamental statute of 24 Aug. 1815 (art. ccxxvi.), and this statute is still in force in the kingdom of Holland. By art. xviii. of the constitution of Belgium, 1831, it is declared that the press is free, and that no censorship can ever be established. In the German states the liberty of the press was much restrained till 1806, the state-attorney having till then had control over it. After 1814 several states abolished the censorship, though with very different provisions as to the responsibility of authors, printers, and booksellers. In accordance with the unhappy decrees of Carlsbad, 1819, and the resolutions of the German diet of 20 Sept. 1819, the censorship in all the states of the German confederation became one of the conditions of union, but only with regard to books of less than 20 sheets, and journals. These laws were repealed in 1849, but in the course of a few years they were gradually introduced, although in a modified form, and in this form they still exist in most of the separate German states as well as in the empire. In Russia and Austria there is naturally a despotic censorship. In the United States of America a censorship has never existed.

Besides the different degrees of severity with which the censorship is exercised in different countries, it may be divided into different kinds, according to the field which it embraces. (1) A general censorship of the book-trade and of the press, under which even foreign books cannot be sold without the consent of the censors, exists in Russia, Austria, Spain, etc. (Austria has, in the censorship of foreign books, four formulas: (a) *admittitur*, entirely free; (b) *transcat*, free, but without public advertisements for sale; (c) *erga schedam*, to be sold only to public officers and literary men on the delivery of a receipt; (d) *damnatur*, entirely forbidden.) (2) A general censorship of the press, extending only to books printed in the country, exists in Prussia (edict of 10 Sept. 1788; order of the cabinet of 28 Dec. 1824; law of 12 May 1851). (3) A limited censorship, only over works of less than 20 sheets, and journals, is at present the law in the states of the German empire. See PRESS, LIBERTY OF THE.

Boolak, boo-lāk', **Boulak**, or **Bulak**, an Egyptian town on the Nile, and the port of Cairo. Its site was once an island, but that part of the river which separated it from Cairo has been filled up. In 1799 Boolak was burned by the French. Mehemet Ali rebuilt it, and established extensive cotton-spinning, weaving, and printing works, a school of engineering, and a printing establishment, from which is issued a weekly newspaper in Arabic. The town contains a mosque, a naval arsenal, a dockyard, and a custom-house, and is surrounded by the country residences of numerous Egyptian grandees. An electric railway connects it with Cairo. Pop. about 13,000.

Boole, George, English mathematician and logician; b. Lincoln, 2 Nov. 1815; d. Cork, 8 Dec. 1864. Educated in his native place, he opened a school in his 20th year, and by private study gained such proficiency in mathematics that in 1849 he was appointed to the mathematical chair in Queen's College, Cork, where the

BOOM—BOONE

rest of his life was spent. In mathematics he wrote on 'Differential Equations'; 'General Method in Analysis'; 'The Comparison of Transcendents,' etc. In logic he wrote 'An Investigation of the Laws of Thought' (1854), an amplified edition of his earlier 'Mathematical Analysis of Logic' (1847), a profound and original work, in which a symbolic language and notation were employed in regard to logical processes.

Boom, in fortification, and in marine defenses, a strong chain or cable stretched across the mouth of a river or harbor, to prevent the enemy's ships from entering, and having a number of poles, bars, etc., fastened to it; whence the name; as, to cut or burst the boom. It often denotes a long pole employed to extend the sails of a ship, as the main boom, jib boom, etc. The term may also be applied to a pole set up as a sea mark to point out the channel to seamen, when navigating in shallows. The word also designates a hollow, roaring sound; as, the boom of a cannon; the reverberating cry of the bittern. In recent years it is often used to denote a sudden rise in the market value of real estate, stocks, or commodities; an enthusiastic popular movement in favor of any person, cause, or thing; as, a real estate boom, a political boom, a boom in sugar.

Boomerang, a missile or weapon of a peculiar nature used by the natives of Australia. It is from 30 to 40 inches in length, and is made of hard wood. In shape it is curved somewhat like a scimitar or a parabola, or it may have a decided bend in the middle nearly approaching a right angle, the bend being a natural one. The breadth is usually about three inches, and while one surface is flat the other is somewhat rounded. Boomerangs are of different kinds, some being used in war, others in the chase, others for amusement. One variety can be hurled so as to turn while in the air and come back almost to the place whence it was thrown. It is this peculiarity that has made the boomerang so famous, though the returning boomerang, if not used merely for amusement, is only used to bring down birds. In throwing, the weapon is grasped by one end, and after a short run hurled straight in front. It then takes a horizontal position and revolves rapidly as it moves obliquely upward into the air. After a time it curves round, and if he so intends, comes back close to the thrower. It may move for a considerable distance horizontally at only a few feet above the ground, and then suddenly rise vertically upward with great velocity. The peculiarly irregular character of its path through the air, and the rapid change in its direction of movement, render it a very efficient weapon for killing birds. There is also a special boomerang for killing birds capable of being thrown in a straight course of 200 yards. The Australian natives often throw the boomerang in such a way as to cause it to strike the ground about 30 feet off; this is said to impart increased velocity, and the weapon may even hit the ground a second time and rebound into the air. The war boomerang is larger and heavier than that used in hunting. Weapons similar to the boomerang, or kiley, as the Australians also call it, but lacking the property of returning, have been, and still are, used by other races, notably the ancient Egyptians and the modern

Abyssinians. Sir Samuel Baker describes the latter as about two feet long, and made of a piece of flat hard wood, whose end turns at an angle of 30°. Various derivations of the word have been suggested, one connecting it with a root meaning strike or kill, and another with the native word for wind.

Boondoe, boon-dé', or **Bundi**, a native state of Hindustan, in Rajputana, under British protection; area 2,300 square miles. A range of hills running from southwest to northeast, penetrated by few passes and rising to the height of 1,793 feet, divides the state into two almost equal portions, that on the south being the more fertile. Much of the state is underwood. The chief river is the Mej, which penetrates the central range, and joins the Chambal near the northeast extremity of the state. It was much more extensive before Kotah and its territory were separated from it. The inhabitants are of the Hara tribe, which has given birth to many famous men, and, among others, to Ram Singh Hara, one of Aurungzebe's most renowned generals. The ruler is practically absolute in his own territory. Pop. (1901) 171,227. **BONDEE**, the capital, is picturesquely situated on a steep slope in a gorge in the centre of the hills above mentioned, and its antiquity, numerous temples, and magnificent fountains, give it a very interesting appearance. It is crowned by a fort and surrounded by fortified walls. For picturesque effect its main street is almost unequalled. At its upper extremity stands the palace, built of stone, with turreted windows and battlements, supported partly by the perpendicular rock, and partly by solid piers of masonry 400 feet high. At its lower extremity is the great temple dedicated to Krishna. Pop. 31,000.

Boone, Daniel, American pioneer: b. Bucks County, Pa., 11 Feb. 1735; d. 26 Sept. 1822. He was one of 11 children. His father emigrated from England, and when Daniel was very young removed with his family from Bucks into Berks County, not far from Reading, then a frontier settlement, exposed to Indian assaults. It abounded with game, and thus, Daniel became accustomed to a life in the woods, and formed an intense love for uncultivated nature. His education was confined to a knowledge of reading, writing, and arithmetic. When he was about 18 his father removed to North Carolina and settled on the Yadkin. Here, in 1755, Daniel married Rebecca Bryan, and for some years followed the occupation of a farmer, but about 1761 his passion for hunting led him, with a company of explorers, along the wilderness at the head waters of the Tennessee River. In 1764 he joined another company of hunters on the Rock Castle, a branch of the Cumberland River. He had become dissatisfied with life in North Carolina. The customs of the colony were becoming luxurious; the rich were exempt from the necessity of labor, and the people were much oppressed by taxes. Boone imbibed a chronic hatred of law forms which lasted through life, and his neglect of these, in securing his titles to land, reduced him to poverty on more than one occasion.

In 1767 a backwoodsman named John Finley made an excursion farther west than had before been attempted, and returned with glowing accounts of the border region of Kentucky, which he represented as a hunter's paradise. Boone

BOONE

headed a party of six for its exploration, leaving his Yadkin home 1 May 1769. On 7 June, in the same year, they reached an elevation from which they beheld the whole region watered by the Kentucky River and its tributaries. At this point on the waters of the Red River, a branch of the Kentucky, and supposed to be within the present limits of Morgan County, they halted and hunted until December without seeing a single Indian, although they were continually on the alert for them. They then separated into parties, Boone and a man named Stewart keeping company, and on 22 December these two were surprised and captured by Indians, who robbed them and kept them prisoners for seven days, when they managed to make good their escape. Early next month Boone and Stewart were gratified by the arrival in the wilderness of Daniel's younger brother Squire and another hunter from North Carolina, bringing tidings of the family at home and a much-needed supply of powder and lead. Soon after this event Stewart and Boone were again attacked by Indians. Boone escaped, but his companion was shot and scalped, and the man who came with Squire having perished in the woods the two brothers were left alone together. On 1 May it was decided that Squire should return for supplies, while Daniel remained to take care of and increase the store of peltry. They parted, and until 27 July, when Squire returned, Daniel remained in utter solitude, without bread, salt, or sugar. The brothers then continued their explorations over other parts of Kentucky until March 1771, when, taking as much peltry as their horses could carry, they returned to their families on the Yadkin, Daniel having been absent about two years, during which time he had seen no human beings but his hunting companions and the hostile Indians. He was now anxious to remove to Kentucky, and although his wife and children were easily persuaded to do so, two years elapsed before he could make the necessary arrangements. He sold his farm, and on 25 Sept. 1773, the two brothers, with their families, set out for Kentucky. At Powell's Valley, through which their route lay, they were joined by five families and 40 men well armed, but on approaching Cumberland Gap, near the junction of Virginia, Kentucky, and Tennessee, they were attacked by Indians and were forced to retreat 40 miles to Clinch River, leaving six of their party slain, among whom was Boone's eldest son, James. The emigrants were much disheartened, and Boone remained at Clinch River until June 1774, when Gov. Dunmore sent him a message to proceed to the wilderness of Kentucky and conduct thence a party of surveyors who were believed to be in danger from the Indians. This undertaking was successful, but no incidents of it have been preserved excepting that Boone was absent 62 days, in which he traveled on foot 800 miles. While he was gone to Kentucky the Shawnees and other Indians northwest of the Ohio River became hostile. Boone was appointed to the command of three contiguous garrisons, with the commission of captain, and, having fought several battles and defeated the Indians, he returned to his family on Clinch River and spent the next winter in hunting. He was shortly after employed by the Transylvania Company, established to purchase lands in Kentucky, to explore, mark, and open a road

from settlements on the Holston to the Kentucky River. In the face of great dangers this was accomplished, and on 1 April 1775, a site having been selected on the bank of the Kentucky River, the party erected a stockade fort and called it Boonesborough. Boone soon removed his family to the new settlements, his wife and daughters being the first white women that ever stood on the banks of the Kentucky. The winter and spring of 1776 wore away without any particular incident, as the Indians, though by no means friendly, made no direct attack. On 14 July a daughter of Boone and two female companions were captured by a party of Indians, but next morning Boone and his companions followed the trail and surprised the Indians so suddenly that they had not time to murder their captives, and the three girls were restored to their families. During the whole of 1777 Boone was employed with his command in repelling the attacks of the Indians, who were incited to the most savage deeds of cruelty by the British during the Revolutionary War. His services were of incalculable advantage to the new settlements. On 1 Jan. 1778, the people suffering greatly for want of salt, he headed a party for the lower Blue Licks to manufacture it, and on 7 February, while at some distance from the camp, he was surprised and made prisoner by a party of 100 Indians. Again in this instance his consummate knowledge of the red man's character saved him and his friends. He ingratiated himself in their regard, and obtained favorable terms for his party at the Licks, who became prisoners of war under the promise of good treatment. He knew that the Indians would march to attack Boonesborough, and that if he and his party resisted they would all be murdered and those at the fort massacred, as no warning could reach them. He was conducted to old Chillicothe, and thence to Detroit, where he was kindly received by the English commander, Gov. Hamilton. In order to baffle his captors he pretended to be very much pleased with his mode of life among the Indians, went through the form of adoption by them, having his hair pulled out excepting the scalp-lock, "his white blood washed out" in the river, and his face painted. On 16 June he went out to hunt, and when out of view, started direct for Boonesborough, more than 160 miles distant, which he traveled in less than five days. He reached Boonesborough in time to warn the garrison. All supposed him dead, and his wife, under that impression, had returned with her children to North Carolina. The fort was at once put in complete order for defense, and on 8 August it was besieged by 444 Indians, led by Capt. Duquesne and 11 other Canadians, having French and British colors. Summoned to surrender, Boone replied with defiance, and after a savage attack upon the fort the assailants, six times greater in number than the garrison, raised the siege, leaving 37 of their party killed and many more wounded. Boone was now promoted to the rank of major. In 1778 he went to North Carolina to see his family. The next year, having invested nearly all his little property in paper money to buy land warrants, and having, besides his own, large sums of money to invest for other people, he was robbed of the whole, about \$20,000, on his way from Kentucky to Richmond, where the court of commissioners was held to decide on

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BOORHANPOOR — BOOTH

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Boorhanpoor, boo-rün-poor', India, a town of the Deccan, in the division of Nerhudda and the district of Nimar, formerly capital of the province of Candeish, on the north side of the Taptee. When viewed from the opposite side of the river it presents rather an imposing appearance. Many of the streets are wide, regular, and paved with stone; as are also the Raj Bazaar and the market-place, an extensive square, the two handsomest places in the town. The most remarkable public edifices are the Lal Kilah, or Red Fort, a palace built by Akbar, and though much dilapidated, exhibiting still many remains of imperial magnificence; and the Jumma Musjeed, or great mosque, built by Aurungzebe. A singular sect of Mohammedans, named Bohrah, have their headquarters here. They are the chief merchants in this part of India, have Arab features, wear the Arab costume, and derive their origin from a disciple of their great prophet. Boorhanpoor was formerly famous for its muslin and flowered silk manufactures, which are still carried on to a considerable extent. Pop. (1891) 32,252.

Booro, boo'rō, one of the Molucca Islands, in the Indian Archipelago, west of Amboyna, belonging to the Dutch. It is oval in shape, 92 miles long, and 70 broad. It has several bays, of which Cajeli is the largest, and contains a safe harbor sheltered from the monsoons. Viewed from this bay the island has a very fine appearance. In the foreground the minarets and native houses are seen through the openings of the rich tropical vegetation; while lofty mountains, wooded to their summits, shut in the

view. The island is watered by 125 streams, large and small. On the northwest side there are vast swamps swarming with crocodiles. The island contains some high mountains — Mount Tumahu having an altitude of 8,530 feet. Booro produces a variety of valuable woods, balsams, resins, and odoriferous flowers. The chief article of export is cajeput oil, of which about \$50,000 worth is exported yearly; most being sent to Java. The tree from which it is obtained (*Melaleuca cajuputi*) grows also upon the islands of Amboyna, Ceram, Celebes, and Sumatra; but the best oil is procured in Booro. The population (about 60,000) consists of Alfoories in the interior, and Malays on the coast.

Booroojird, **Burujird**, or **Boorojerd**, booroo-jerd, Persia, a town in the province of Luristan, capital of a district of same name, 190 miles northwest from Ispahan, with a castle and several mosques. It lies in a fertile and well-cultivated valley, yielding saffron, belonging to the Lack tribe. Pop. 20,000.

Boot, an article of dress, generally of leather, covering the foot and extending to a greater or less distance up the leg. The sandal formed the chief foot-covering among the Greeks and Romans, and it is still in common use among Eastern nations. The boot, properly so called, came into use as part of the warrior's equipment about the 14th or 15th century, and since then it has assumed many different forms. The jackboot, a kind of top-boot not yet altogether discarded, was in common use during the latter half of the 17th century, but was to a great extent displaced by the Hessian, which in its turn has given way to more recent forms. The name was given to an instrument of torture made of iron, or of iron and wood, fastened on to the leg, between which and the boot wedges were introduced and driven in by repeated blows of a mallet, with such violence as to crush both muscles and bones. The special object of this form of torture was to extort a confession of guilt from an accused person.

Bootan. See BHUTAN.

Boötes, bō-ō'tēz ("ox-driver," from Gr. *bous*, an ox), a northern constellation; called also by the Greeks, Arctophylax. Arcturus was placed by the ancients on his breast; by the moderns, on the skirt of his coat. Fable relates that Philomelus, son of Ceres and Jason, having been robbed by his brother, Plutus, invented the plough, yoked two bulls to it, and thus supported himself by cultivating the ground. Ceres, to reward his ingenuity, transferred him, with his cattle, under the name of *Boötes*, to the heavens.

Booth, Agnes (Mrs. JOHN B. SHOEFFEL), American actress: b. Sydney, Australia, 1846. She made her first American appearance in New York in 1865, becoming later Edwin Forrest's leading lady. She has assumed numerous famous roles with success. She has been three times married.

Booth, Ballington, general of the Volunteers of America: b. Brighthouse, England, 28 July 1850. He is a son of William Booth (q.v.), founder of the Salvation Army, with which body he was officially connected until 1896, when he seceded and founded the Volun-

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Boorde, or Borde, bôrd, Andrew, English traveler and physician: b. near Cuckfield, Sussex, about 1490; d. 1549. He entered the Carthusian order at the Charterhouse, London, and in 1521 was appointed suffragan bishop of Chichester. The rigor of the Carthusian discipline was too much for him, and about 1528 he obtained a dispensation relieving him from his

vow. He then studied medicine on the Continent, returning to England in 1530, but soon afterward again visited the Continent, where he studied at the chief medical schools, including those of Orléans, Poitiers, Toulouse, Montpellier, and Wittenberg. His journey extended to Rome and Compostella, and in 1534 he was again in England. His next journey was undertaken at the instance of Thomas Cromwell, in order to ascertain continental opinion about Henry VIII. In 1536 he was in Scotland, studying and practising "in a lytle vnyuersyte or study named Glasco," and he speaks of Scotchmen as deceitful, and inveterate haters of the English. During the years 1538-42 he was again on the Continent, and this time he went as far as Jerusalem. While staying in Winchester his open immorality got him into trouble, and he was afterward lodged in the Fleet Prison, London. Boorde, who jocularly calls himself Andreas Perforatus, was the author of several works, among which are the following: 'Fyrst Boke of the Introduction of Knowledge' (about 1547); a 'Handbook of Europe,' the first of its kind; a 'Dyetary' (1542); a medical treatise entitled 'Breyary of Health' (1547); 'Boke of Berdes,' a condemnation of the beard, known only through an extant portion of a reply by another writer; a book on 'Astronomye'; an 'Itinerary of England'; an 'Itinerary of Europe'; 'Boke of Sermons'; etc. His 'Fyrst Boke' contains the first printed specimen of the Gypsy language. Many other works, such as 'The Merry Tales of the Mad Men of Gotham,' have been ascribed to Dr. Boorde. Dr. Furnivall edited his 'Introduction' and his 'Dyetary' for the Early English Text Society in 1870.

Boorhanpoor, boo-rūn-poor', India, a town of the Deccan, in the division of Nerbudda and the district of Nimar, formerly capital of the province of Candeish, on the north side of the Taptee. When viewed from the opposite side of the river it presents rather an imposing appearance. Many of the streets are wide, regular, and paved with stone; as are also the Raj Bazaar and the market-place, an extensive square, the two handsomest places in the town. The most remarkable public edifices are the Lal Kilah, or Red Fort, a palace built by Akbar, and though much dilapidated, exhibiting still many remains of imperial magnificence; and the Jumma Musjeed, or great mosque, built by Aurungzebe. A singular sect of Mohammedans, named Bohrah, have their headquarters here. They are the chief merchants in this part of India, have Arab features, wear the Arab costume, and derive their origin from a disciple of their great prophet. Boorhanpoor was formerly famous for its muslin and flowered silk manufactures, which are still carried on to a considerable extent. Pop. (1891) 32,252.

Booro, boo'rō, one of the Molucca Islands, in the Indian Archipelago, west of Amboyna, belonging to the Dutch. It is oval in shape, 92 miles long, and 70 broad. It has several bays, of which Cajeli is the largest, and contains a safe harbor sheltered from the monsoons. Viewed from this bay the island has a very fine appearance. In the foreground the minarets and native houses are seen through the openings of the rich tropical vegetation; while lofty mountains, wooded to their summits, shut in the

view. The island is watered by 125 streams, large and small. On the northwest side there are vast swamps swarming with crocodiles. The island contains some high mountains — Mount Tumahu having an altitude of 8,530 feet. Booro produces a variety of valuable woods, balsams, resins, and odoriferous flowers. The chief article of export is cajeput oil, of which about \$50,000 worth is exported yearly; most being sent to Java. The tree from which it is obtained (*Melaleuca cajuputi*) grows also upon the islands of Amboyna, Ceram, Celebes, and Sumatra; but the best oil is procured in Booro. The population (about 60,000) consists of Alfoories in the interior, and Malays on the coast.

Booroojird, Burujird, or Boorojerd, booroo-jerd, Persia, a town in the province of Luristan, capital of a district of same name, 190 miles northwest from Ispahan, with a castle and several mosques. It lies in a fertile and well-cultivated valley, yielding saffron, belonging to the Lack tribe. Pop. 20,000.

Boot, an article of dress, generally of leather, covering the foot and extending to a greater or less distance up the leg. The sandal formed the chief foot-covering among the Greeks and Romans, and it is still in common use among Eastern nations. The boot, properly so called, came into use as part of the warrior's equipment about the 14th or 15th century, and since then it has assumed many different forms. The jackboot, a kind of top-boot not yet altogether discarded, was in common use during the latter half of the 17th century, but was to a great extent displaced by the Hessian, which in its turn has given way to more recent forms. The name was given to an instrument of torture made of iron, or of iron and wood, fastened on to the leg, between which and the boot wedges were introduced and driven in by repeated blows of a mallet, with such violence as to crush both muscles and bones. The special object of this form of torture was to extort a confession of guilt from an accused person.

Bootan. See BHUTAN.

Boötes, bō-ō'tēz ("ox-driver," from Gr. *bous*, an ox), a northern constellation; called also by the Greeks, Arctophylax. Arcturus was placed by the ancients on his breast; by the moderns, on the skirt of his coat. Fable relates that Philomelus, son of Ceres and Jason, having been robbed by his brother, Plutus, invented the plough, yoked two bulls to it, and thus supported himself by cultivating the ground. Ceres, to reward his ingenuity, transferred him, with his cattle, under the name of *Boötes*, to the heavens.

Booth, Agnes (Mrs. JOHN B. SHOEFFEL), American actress: b. Sydney, Australia, 1846. She made her first American appearance in New York in 1865, becoming later Edwin Forrest's leading lady. She has assumed numerous famous roles with success. She has been three times married.

Booth, Ballington, general of the Volunteers of America: b. Brighthouse, England, 28 July 1850. He is a son of William Booth (q.v.), founder of the Salvation Army, with which body he was officially connected until 1896, when he seceded and founded the Volun-

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teers, a religious body under the form of a military organization, organized in the interest of the unchurched masses.

Booth, Barton, English actor: b. 1681; d. May 1733. He was educated under Dr. Busby, at Westminster School. An early attachment for the drama was fostered by the applause he met with while performing a part in one of Terence's plays at the annual exhibition in that seminary. He ran away from school at the age of 17, and joined Ashbury's company of strolling players, with whom he went to Dublin. After performing three years in the Irish capital with great applause, he returned in 1701 to London, and, engaging with Betterton, met with similar success. On the death of that manager he joined the Drury Lane Company, and on the production of 'Cato' in 1712, raised his reputation as a tragedian to the highest pitch by his performance of the principal character. It was on this occasion that Lord Bolingbroke presented him from the stage box with 50 guineas—an example which was immediately followed by that nobleman's political opponents. Declamation, rather than passion, appears to have been his forte, though Cibber speaks of his Othello as his finest character. He became a patentee and manager of the theatre in 1713, in conjunction with Wilks, Cibber, and Doggett. He was buried in Westminster Abbey, where there is a monument to his memory. He was the author of *Dido and Æneas*, a mask, various songs, etc., and the translator of several odes of Horace.

Booth, Edwin Thomas, American actor (fourth son of Junius Brutus Booth, q.v.): b. near Befair, Md., 13 Nov. 1833; d. 7 June 1893. When 16 years of age he made his first appearance on the stage, in the part of Tressel, his father acting as Richard III. Two years later he himself successfully assumed the part of Richard in place of his father, who unexpectedly refused to fulfill an evening's engagement. The following year the two went to California, where the son remained for several years, visiting Australia meanwhile. Meeting with little pecuniary success, in 1856 he returned to the Atlantic States, and from that time forward was recognized as a leading member of his profession. He visited England (1861-2), and in 1864 produced 'Hamlet' at New York for 100 nights consecutively. In 1860 he opened a splendid theatre in New York, whose building cost over \$1,000,000, but which involved him in pecuniary ruin. He revisited California in 1876, and in the spring of 1877 was able to settle with his creditors, having earned during the season over \$600,000. Booth visited Great Britain and Germany in 1880-2, and was everywhere received with enthusiasm. He was founder and first president of the Players' Club, New York.

Booth, James Curtis, American chemist: b. Philadelphia, 28 July 1810; d. West Haverford, Pa., 21 March 1888. He graduated at the University of Pennsylvania in 1820, and in December 1832 went to Germany and entered the private laboratory of Prof. Friedrich Wöhler in Cassel, being, it is thought, the first American student of analytical chemistry to study in Germany. Later he studied in Berlin and made a practical study of applied chemistry in European manufacturing centres. Returning to Philadelphia in 1836 he opened a

laboratory for instruction in chemical analysis and applied chemistry. This soon became widely known and attracted students from all parts of the country. In 1836 he was made professor of chemistry applied to the arts in the Franklin Institute; during 1837-8 he had charge of the geological survey of Delaware, and assisted in that of Pennsylvania; in 1849 he was appointed melter and refiner at the United States mint in Philadelphia, an office he held until his resignation, 7 Jan. 1888. His studies of the nickel ores of Pennsylvania led, in 1856, to the adoption of nickel as one of the components of the alloys used in the coinage of the 1857 cent. Publications: 'Annual Report of the Delaware Geological Survey' (1839); 'Memoirs of the Geological Survey of Delaware' (1841); 'Encyclopædia of Chemistry, Practical and Applied' (1850); 'Recent Improvements in the Chemical Arts' (Wash. 1851); and he edited, with notes, a translation of Regnault's 'Elements of Chemistry' (2 vols. Phila. 1853).

Booth, John Wilkes, American actor (son of Junius Brutus Booth, q.v.): b. Hartford County, Md., 1839; d. 1865. He sided with the Confederates in the Civil War, and to avenge the defeat of their cause he formed a conspiracy against the life of President Lincoln. He mortally wounded the President while the latter was attending a performance in Ford's Theatre, Washington, 14 April 1865; in escaping from the building he broke his leg, and concealed himself in Virginia till the 26th, when, on being discovered, and refusing to surrender, he was shot.

Booth, Junius Brutus, English tragedian: b. London, 1 May 1790; d. Dec. 1852. After fulfilling engagements at Deptford, near London, and other places, and even performing at Brussels, in 1814 he made his debut at Covent Garden Theatre, London, as Richard III. His personal resemblance to the crookbacked tyrant conformed exactly to the traditions of the stage, and his personification of the character was in other respects so striking that he competed successfully with Edmund Kean, then just rising into fame. In 1821 he made his first appearance in the United States, at Petersburg, Va., and in New York, at the Park Theatre, in the succeeding year, on both of which occasions he assumed his favorite character of Richard III. From that time until the close of his life he acted repeatedly in every theatre in the United States, and in spite of certain irregular habits, which sometimes interfered with the performance of his engagements, enjoyed a popularity which a less gifted actor would have forfeited. During the latter part of his life he resided with his family at Baltimore, making occasional professional excursions to other cities. He had just returned from a lucrative tour to California when he died. The range of characters which Booth assumed was limited, and was confined almost exclusively to those which he had studied in the beginning of his career. He is most closely identified with that of Richard, in which, after the death of Edmund Kean, he had no rival. Among his other most familiar personations were Iago, Shylock, Hamlet, Sir Giles Overreach, and Sir Edmund Mortimer. In his peculiar sphere,—the sudden and nervous expression of concentrated passion,—as also in the more quiet and subtle passages of his

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delineations, he exercised a wonderful sway over his audience, and his appearance upon the stage has been known to awe a crowded and tumultuous house into instant silence. His presence and action, notwithstanding his short stature, were imposing, and his face, originally molded after the antique type, was capable of wonderful expression under the influence of excitement. Several of his children inherited a portion of his dramatic talent, and became prominent actors on the American stage.

Booth, Mary Louise, American journalist and author: b. Yaphank, Long Island, N. Y., 19 April 1831; d. New York, 5 March 1889. She was widely known as the editor of 'Harper's Bazaar,' which place she held from 1867 till her death. Her 'History of the City of New York' was the first complete work upon the subject and is still probably the best. It was published in 1859, a second edition in 1867; a third, thoroughly revised, in 1880. No book has been a greater favorite of local collectors. One copy was extended to nine large volumes and enlarged by many thousand illustrations; another, owned by the author, had 2,000 illustrations inserted; and a third was extended to 22 volumes. Miss Booth's translations number over 30 volumes. They are chiefly from the French of About, Victor Cousin, Mery, Gasparin, and Laboulaye. The most pretentious is Henri Martin's 'History of France,' six volumes of which she finished.

Booth, Maud Ballington, a leader of the Volunteers of America: b. near London, 1865. She was active in the work of the Salvation Army in England, and established a corps of the Salvation Army in Switzerland. In 1887 she married Ballington Booth, and in 1896 joined him in seceding from the Salvation Army and organizing the Volunteers of America. She has been active in work for prisoners, both during their imprisonment and after their release. She is author of 'Branded' and 'Look Up and Hope.'

Booth, William, founder of the Salvation Army: b. Nottingham, England, 10 April 1829. He was educated in his native town, and from 1850 to 1861 acted as minister of the Methodist New Connection. From the first he was zealous in holding evangelistic services, but the new departure which led to the creation of the Salvation Army on military lines began in 1865 with mission work among the lower classes in the East End of London. Since 1878 Booth's movement has been known as the Salvation Army, of which he has continued to be the mainspring and controlling power, directing its movements at home and abroad from his headquarters in London. His enthusiasm and wonderful organizing power have given life to the religious military system, of which he is "general." The property of the Salvation Army is held for its exclusive use by Booth. His wife was associated with him in the publication of several hymns and religious works dealing with the movement, till her death in 1890.

Booth-Tucker, Emma Moss, a leader in the Salvation Army: b. Gateshead, England, 8 Jan. 1860. She is a daughter of William Booth, the organizer of the "Army"; in 1880-8, she had charge of international training homes; in 1888 she married Commander Booth-Tucker, went with him to India, and in 1896 came to the

United States. She holds the rank of consul in the Salvation Army, and has joint authority with her husband in its direction in the United States.

Booth-Tucker, Frederick St. George de Latour, American evangelist: b. India, 1853. He held important official posts in India, but resigned them in 1881 to join the Salvation Army. Upon his marriage with Emma Moss Booth, daughter of "Gen." William Booth of the Salvation Army, he prefixed Booth to his own name of Tucker. In 1896 he became commander of the United States branch of the Salvation Army.

Boothby, Guy Newell, English novelist: b. Adelaide, South Australia, 13 Oct. 1867. In 1891 he crossed Australia from north to south and has also traveled in the East. His novels include: 'On the Wallaby'; 'A Bid for Fortune'; 'Beautiful White Devil'; 'Dr. Nikola'; 'Fascination of the King'; 'Billy Binks, Hero, and Other Stories'; 'Across the World for a Wife'; 'Pharos, the Egyptian'; 'Love Made Manifest'; 'Dr. Nikola's Experiment'; 'A Sailor's Bride'; 'A Maker of Nations'; 'My Indian Queen'; 'Farewell Nicola' (1901); and 'The Viceroy's Protégé.'

Boothia Felix, a peninsula on the north coast of North America, in which is the most northern part of the continent, Murchison Point, lat. 73° 54' N. It is joined to the mainland by Boothia Isthmus, is bounded on the north by Bellot Strait, and to the east is separated from Cockburn Island by Boothia Gulf (q.v.) It was discovered by Sir John Ross (1829-33), and named after Sir Felix Booth, who had furnished \$85,000 for the expedition. Here, on the west coast, near Cape Adelaide, Ross discovered the magnetic pole, lat. 70° 5' 17" N.; lon. 96° 46' 45" W.

Boothia, Gulf of, a southward continuation of Prince Regent Inlet in the northern part of Canada, lying between Boothia Felix (q.v.) on the west and Cockburn Island on the east.

Bootle, England, a municipal and county borough in Lancashire, near the mouth of the Mersey, and adjoining Liverpool, the docks of which great seaport extend into the borough, covering 370 acres and constructed at a cost of £2,500,000. The principal buildings are the town hall and municipal buildings, school-board offices, and hospital. Many churches provide for the public worship of the inhabitants. The trade of the town is almost exclusively connected with shipping, timber being the chief import; most of the American steamers have their loading berths here. There are large jute-mills, corn-mills, foundries, etc. Bootle has ample railway facilities and tramway cars. The Leeds and Liverpool Canal passes through it. There is a municipal electrical station. The history of the place is included in that of Liverpool. It was incorporated in 1868. Pop. (1901) 58,558.

Boot'on, or **Bou'ton**, an island of the Malay Archipelago, separated by a narrow strait from the southeast ray of Celebes, and from the island of Muna. Area, 1,700 miles. It is high, but not mountainous, and thickly wooded; produces fine timber, rice, maize, sago, etc. The people are Malays. The sultan, who resides at Bolio, is in allegiance to the Dutch, an under-resident being stationed on the island. Pop. 17,000.

BOOTS AND SADDLES — BOOTS AND SHOES

Boots and Saddles, or Life in Dakota with General Custer, by Elizabeth B. Custer (1885). The author says that her object in writing this book, which records her experiences in garrison and camp with her husband, was to give civilians a glimpse of the real existence of soldiers in the field. Her married life was not serene; she was left in 1864 in a lonely Virginia farmhouse to finish her honeymoon alone, her husband being summoned to the front; and at scarcely any time during the next 12 years was she free from fear of immediate or threatened peril. Gen. Custer was ordered to Dakota in the spring of 1873. Mrs. Custer's book gives a lively and detailed account of their life there from 1873 to 1876, the time of the general's death. There is an interesting chapter on Gen. Custer's literary habits, and an appendix containing extracts from his letters.

Boots and Shoes, the foot-coverings in use among most of the civilized nations of the world, varying in form and material according to the necessities of climate and the dictates of fashion, as well as by their use by different ages, sexes, and varying social classes. Foot-coverings which would be sufficient amid tropical sands would be most unsuitable for withstanding the rigors of an arctic winter, and the ballroom slipper would be utterly useless to protect a miner's foot. The elementary foot covering is the sandal, which consists only of a pad or sole shaped to the sole of the foot, and held on by straps or thongs. From the sandal grows up the slipper, in which straps and lacing are dispensed with, and a sufficient upper of leather or other soft material is provided to keep the article on the foot. The ordinary short shoe is the next development, it being laced, buttoned, or otherwise fastened on the foot; and in the boot the upper is continued so as to embrace more or less of the leg.

The sandal is the most ancient foot-covering of which we have any record, and examples of very ancient manufacture, taken from Egyptian mummies, are preserved in public collections. The shoe frequently referred to in the Old Testament, and which played an important part in buying and selling, and in other social usages, was a sandal. The common sandal of the ancient Egyptians consisted of strips of papyrus plaited into a kind of mat, and that form remains the type of sandal of plaited grass or straw worn to this day by multitudes in central Asia, India, China, and Japan. The sandal was the ordinary shoe of the ancient Greeks. In Greece, shoes were used only in exceptional circumstances, and long boots lacing up the front were worn by hunters. Sandals (*soleæ*) were the everyday wear of the Roman populace; the patricians wore shoes (*calcei*) of black leather; red leather shoes were reserved for the senators; and the long boot or buskin (*cothurnus*), reaching, sometimes, to near the knee, and frequently supplied with a thick sole to add to the apparent stature of its wearer, was appropriated to tragedians and hunters. Sandals and slippers continue to this day to be the staple footwear of Oriental communities, and great wealth of ornamentation—inlaving of wood in sandals, and elaborate embroidery in gold and colored silks, with fantastic curling of the toes—are characteristics of the richer productions of the Eastern tradesmen.

In mediæval times, shoes with long, pointed toes were worn by the high-born; and toward the end of the 14th century these points became ridiculously elongated, so that there appeared to be a long strap projecting from each foot. Different kinds of half-boot were worn by the Anglo-Saxons and Anglo-Normans; and in the reign of Edward IV., if not earlier, the boot proper, with tops and spurs, was established as an article of knightly dress. In the reign of Charles I. a species of boot, exceedingly wide at the top, made of Spanish leather, came into use; and with Charles II. the highly decorated French boot was introduced as an article of gay courtly attire. Meanwhile the jack-boot, as it is called, had become indispensable in the costume of cavalry soldiers and horsemen generally; and by William III. and his followers it was regularly naturalized in England. This huge species of boot remained in use in British cavalry regiments until comparatively recent times, and, in a somewhat polished and improved form it is still worn by the Horse Guards. The jack-boot is almost entitled to be called the parent of the top and some other varieties. Boots with tops of a yellow color were so commonly worn by gentlemen in the 18th century as to become a peculiarity in the national costume of the English. When Philip, Duke of Orleans, and other revolutionists of note, affected to imitate the sentiments and manners of the English they ostentatiously wore top-boots. Among jockeys and fox-hunters, top-boots are likely to remain in permanent use. What, perhaps, contributed to break up their general use was the introduction of the Hessian boot as an article of walking dress. Worn over tight pantaloons, the Hessian boot was a handsome piece of attire, giving, undoubtedly, an elegant appearance to the nether costume. Boots of this shape were worn by English general officers in the early part of the French war, and somewhat later. At length they were superseded by the well-known Wellington boot, which, as its name imports, was introduced by the great Duke, as a simplification, under the loose military trouser. When the name of Blücher was given to a half-boot, the Wellington was almost entirely abandoned in England in consequence of the universal use of short ankle-boots. It is still largely used in some Continental countries and in the United States.

For many reasons the ancient domestic craft of shoemaking is dying out. Machinery and appliances for every operation are being gradually perfected, and although no machine work can equal in combined solidity and elasticity the productions of a first-class craftsman, superior operatives are comparatively scarce, and the products of the factory are at least even in quality, and much cheaper than hand-made boots and shoes. Shoemaking as a handicraft is a sedentary and contemplative industry. The foot to be fitted being duly measured, the upper leathers are cut out and sewed together, an operation called closing. The stuff for the soles is then cut out of tanned oxhide, the pieces being the insole, the outsole, and the lifts of the heel. These are steeped in water; a last or foot model suitable for the boot or shoe to be made is chosen, and to the bottom of it the insole leather is nailed; and then by pulling and hammering it is molded accurately

to follow the contour of the last sole. The edges of the insole are then pared and rounded down; the upper is drawn tightly down over the last, and its lower edge is nailed temporarily over the edge of the insole. A narrow strip of leather, the welt, sufficient to run round the whole sole excepting the heel part, is then selected, and the three edges, sole, upper, and welt, are by an inseaming stitch sewed together. The welt then forms a band to which the outsole is sewed around the edges. The heel lifts are built up, and sewed and nailed together; and the finishing operations include the burnishing of the sole and edges, the insertion of eyelets or buttons in the uppers, etc.

The shoe trade as a factory industry only grew with the development of the sewing-machine, and now, except for repairing, there is scarcely such a thing as hand-sewing in the uppers of shoes. The great difficulty which, apart from hand-sewing, at first lay in the way of applying machinery to shoemaking, was in the fastening together of the sole and the uppers. Early in the 19th century one Randolph, and a little later the celebrated engineer, Sir M. I. Brunel, patented methods of fastening together soles and uppers by means of metal pins and rivets. The upper leather was drawn well over the insole, the outer sole was then applied, and the whole pinned together and riveted by the points of the pins coming against and being turned by an iron-shod last inside. The germs of the modern sewing-machine were embodied in a patent secured in 1790 by Thomas Sant, the object of his invention being to sew boots and shoes; but the sewing-machine was not applied to bootmaking till after its success in ordinary stitching was demonstrated. A machine for sewing together soles and uppers was patented in the United States by Blake, and, as subsequently improved by Mackay, it became the apparatus which, for the period during which the patents were current, dominated the factory shoemaking industry. The Blake-Mackay machine sewed through outsole, upper, and insole at one operation; but as the corporation owning the machine held the patent right for machine-sewed boots and shoes, improvements by outsiders were for the time barred. Now there are in operation many varieties of sewing-machines, some of which sew welted boots in all respects like the hand-made product.

Factory-made boots and shoes are now entirely cut out by machinery, the uppers are sewn by strong sewing-machines, and soles and uppers are fastened together either by (1) sewing, (2) pegging with wooden pegs, (3) riveting with metal pins, or (4) screwing by means of the Standard screw machine. The latter most ingenious apparatus uncoils a reel of screwed brass wire, inserts it into the sole, and cuts off the wire flush with the outsole with remarkable rapidity; and for solidity and durability the work leaves nothing to be desired.

Both in the United States and Great Britain the factory trade in boots and shoes has, since 1860, undergone a remarkable development. In the former the trade is generally distributed throughout the New England States; in the latter, Northampton is the capital of the industry, the other towns in which it forms a prominent feature being Leicester, Stafford, Norwich, Bristol, Linlithgow, and Maybole.

Some idea of the extent of the boot and shoe industry in the United States is afforded by the census returns of 1900.

In the factory manufacture of boots and shoes there were 1,600 establishments, with \$101,795,233 capital, employing 142,922 persons, which paid \$59,175,883 in wages and \$169,604,054 for materials, and had an output valued at \$261,023,580. Besides supplying our whole population, the different establishments in the United States, in the fiscal year ending 30 June 1899, exported to various parts of the world finished boots and shoes to the value of \$2,711,385.

Boott, Francis, American composer: b. Boston, Mass., 1813. His musical education was received largely in Florence, Italy, where he became an honorary professor in the Academy of Fine Arts. He has composed a *Mass* for voices and orchestra, a *Te Deum*, a *Maria Mater*, a *Miserere*. He is best known as the writer of the music to the following songs, among others: Tennyson's 'Break, Break, Break'; Thackeray's 'Rose Upon the Balcony'; Longfellow's 'Kyrie Eleison'; Charles Kingsley's 'Sands o' Dee'; and Jean Ingelow's 'We Two.'

Bopp, Franz, German philologist: b. Mainz, 14 Sept. 1791; d. Berlin, 23 Oct. 1867. With the intention of devoting himself to the study of Oriental literature, he went in 1812 to Paris, where he remained five years. He then lived for some time in London and at Göttingen, and in 1821 received an extraordinary professorship in the University of Berlin, which continued to be his place of residence during the remainder of his life. By his editions of Sanskrit texts and the preparation of highly useful grammatical works, he contributed greatly to the advancement of the study of the old Indian language. But his most important contribution to philology is his 'Comparative Grammar of the Sanskrit, Zend, Greek, Latin, etc.' (Berlin 1834; 2d ed. greatly altered, 3 vols. 1857-61; 3d ed. 1868-71). The great value of this work lies in this, that here for the first time it was clearly demonstrated that the languages of all the races belonging to the great Indo-Germanic stock have arisen out of a common tongue, which now indeed no longer exists as a separate language, but the structure of which we are able, by a philological comparison of the sister languages sprung from it, to restore to a great extent with almost mathematical certainty. Among the numerous other works of Bopp, his 'Critical Grammar of the Sanskrit Language' deserves mention.

Boppard, or Boppart, Prussia, a walled town on the Rhine. It owed its origin to a fort supposed to have been built by Drusus. Its streets are narrow and antiquated, and it contains two fine Gothic churches, a female seminary, and two hydropathic establishments, one of which occupies the former abbey of Marienberg, and is known as the Marienbad (q.v.). The town has some trade and manufactories of cotton, tobacco, and leather. Pop. about 6,000.

Bora, Katharina von, wife of Luther: b. 29 Jan. 1499; d. 20 Dec. 1552. She took the veil very early in the nunnery of Nimptschen, near Grimma; but feeling very unhappy in her situation, applied, with eight other nuns, to Luther, whose fame had reached them. Luther gained over a citizen of Torgau, by the name of

BORACIC ACID—BORASSUS PALM

Leonard Koppe, who, in union with some other citizens, undertook to deliver the nine nuns from their convent. This was done the night after Good Friday, 4 April 1523. Luther brought them to Torgau, and from thence to Wittenberg. At the same time, to anticipate the charges of his enemies, he published a letter to Koppe, in which he frankly confessed that he was the author of this enterprise, and had persuaded Koppe to its execution; and he also exhorted the parents and relations of the virgins to admit them again into their houses. Some of them were received by citizens of Wittenberg; others who were not yet too old Luther advised to marry. Among the latter was Katharina, whom Philip Reichenbach, at that time mayor of the city, had taken into his house. Luther proposed to her several of his friends. She declined these proposals, but declared her willingness to bestow her hand on Nicholas von Amsdorf, or on Luther himself. Luther, who in 1524 had laid aside the cowl, was not averse to matrimony, yet appears to have been led to the resolution of marrying by reason rather than by passion. This step gave rise to many disadvantageous rumors, some of them as shameful as they were unfounded. After Luther's death Katharina removed from Wittenberg to Leipsic, where she was compelled to take boarders for her support. She afterward returned to Wittenberg and finally removed to Torgau, where she died. In the Church of Torgau her tombstone is still to be seen, on which is a life-size image of her.

Borac'ic (-ras'-) **Acid**, or **Bo'ric Acid** (from "borax"), a compound of boron with oxygen and hydrogen, having the formula H_2BO_3 , and possessing feebly acid properties. It occurs in an impure state in the crater of Vulcano, one of the Lipari islands. It is also found plentifully in Tuscany, where it issues from fissures in the soil, together with sulphurous exhalations, ammonia, and other substances. On account of its having been obtained at Sasso, the acid is called by mineralogists Sassolin. The principal supply of boracic acid is obtained from Tuscany, the exhalations above referred to being passed through water which absorbs the acid. The preparation of boracic acid from these aqueous solutions is an interesting process on account of the natural obstacles which have to be surmounted. The apparently simple operation of concentrating the solution, so as to obtain the acid by crystallization, in reality involves great practical difficulties, because in Tuscany the fuel supply is limited. This drawback has been overcome by utilizing the volcanic heat of the district to concentrate the solution. Around the cracks in the soil (called "fumaroles" or "soffioni"), from which the steam containing the acid issues, and enclosing the small lakes or lagoons in which it condenses, brick tanks are built on different levels, but communicating with each other. These are supplied with cold water, in which the steam is further condensed. When the water in the tanks is sufficiently saturated, it is run off into a deep vessel, where it is allowed to stand until the black mud mechanically suspended in it falls to the bottom, and then the clear fluid is run into a series of shallow evaporating pans of lead. These pans are heated by steam from the soffioni, the steam being made to pass under them by a system of flues. As the evaporation proceeds the fluid becomes richer in boracic acid, and when it attains a cer-

tain specific gravity, it is passed into a deep vat, where it is allowed to cool. Boracic acid then crystallizes out. The first crop of crystals is quite impure, but it is improved by re-crystallization, and the second crop as thus obtained is packed in casks and exported. Commercial boracic acid sometimes contains as much as 25 per cent of foreign matter, consisting largely of clay, salts of calcium and magnesium, and sulphates and other salts of the alkalis. About 2,000 tons of crude boracic acid are exported from Tuscany per annum. Boracic acid is also prepared artificially by decomposing a hot solution of borax with sulphuric acid. The boracic acid separates out upon cooling. Boracic acid is a white, glassy substance, slightly soluble in cold water, and considerably more soluble in hot water. It possesses strong antiseptic properties, and is used as a preservative for meat. It is also used for glazing porcelain, and in the manufacture of certain kinds of glass. Boracic acid forms salts called "borates" with various metallic bases, of which borax (q.v.) is the most important. See BORON.

In medicine, boracic acid is used very widely. It is a mild antiseptic, and its solutions are useful for cleansing the eyes, nose, mouth, bladder, etc. It forms with aromatic oils the basis of most mouth washes and nasal sprays. Boracic acid is also very useful in the nursery for keeping nipples free from bacteria, and it is of great service in washing out nursing-bottles, babies' mouths and eyes, and the mother's nipples while nursing. Large doses may prove poisonous.

Bo'racite (from "borax"), a mineral, tetrahedral and isometric in external form, but orthorhombic in molecular structure, and becoming isotropic only when heated to 510° F. It has the composition $6MgO.MgCl_2.8B_2O_3$, and a little iron is also occasionally present, probably as an impurity. It occurs in beds of anhydrite, gypsum, and salt, notably in Hanover and Holstein, at Luneville, France, and at Stassfurt, Prussia. The mineral has been prepared artificially by melting together 10 parts of boracic acid, 100 of sodium chloride, and 5 of magnesium borate. Boracite is strongly pyro-electric. Its molecular structure has been the subject of much study, on account of its exhibiting double refraction, although, as noted above, the mineral is apparently isometric in crystalline form.

Borage, the small genus, typical of the natural order *Boraginaceæ*, the species of which are most numerous in the Mediterranean region. Common borage (*Borago officinalis*), a coarse growing annual herb frequent in waste places, is about two feet tall with erect stem, rough, hairy leaves, and blue flowers arranged in racemes. Like many other innocuous plants, borage was highly valued medicinally, but is now not so employed. It is occasionally raised as a pot herb or salad plant, its young leaves being palatable. The flowers are still used to make the beverage known as cool tankard, a mixture of wine, lemon, sugar, and water. The plant's chief use, however, is as bee pasturage, its flowers being rich in nectar.

Boras, Sweden, a town in the province of Elfsborg, 36 miles east of Gothenburg. It was founded by Gustavus Adolphus in 1632. There are some cotton and linen manufactures, and also some dyeworks. Pop. (1903) 15,837.

Borassus Palm. See PALMYRA PALM.

BORAX — BORDEAUX

Bo'rax, a compound of the metal sodium with boracic acid (q.v.). The formula of boracic acid may be written $\text{HBO}_2 + \text{H}_2\text{O}$; and if the hydrogen of the HBO_2 is replaced by sodium, a compound known as sodium borate is formed, which crystallizes as $\text{NaBO}_2 + 4\text{H}_2\text{O}$. Fused borax is this salt deprived of its water of crystallization, and combined with boron trioxid in the form $2\text{NaBO}_2 + \text{B}_2\text{O}_3$, or $\text{Na}_2\text{B}_4\text{O}_7$. Common borax, when crystallizing from aqueous solution, however, contains 10 molecules of water. Other forms of borax are easily obtained, crystallizing with different quantities of water. Borax occurs native, both as a saline efflorescence on the soil, and as monoclinic crystals. Until recent times the principal borax supply of the world was obtained from the salt lakes of Tibet. It was brought to Europe in the crude state, under the name of Tincal. Enormous quantities of borax are now obtained from California and Nevada. Borax Lake, some 80 miles north of San Francisco, was discovered in 1856. It contains borax in solution, and crystals of the mineral also occur in the surrounding mud and marshes. The crystals are occasionally quite large, weighing as much as a pound each. It is also found in large quantities at another lake in San Bernardino County, Cal., and it occurs abundantly as an efflorescence in Death Valley, Inyo County, Cal. Borax is extensively used in the household, and it is used also as an antiseptic and preservative. Like boracic acid, it is employed in glazing porcelain. Its property of dissolving metallic oxides makes it of great value in blowpipe analysis (q.v.) and as a flux in the soldering of metals. The total production of borax in the United States is upward of 20,000 tons per annum.

Borax is of toxicological interest because it is widely used as an antiseptic, a preservative for meats and other foodstuffs, and also as an abortifacient. In large doses there is marked gastro-enteritis, in addition to which there are symptoms of collapse, coldness of the skin, bad pulse, psychical depression, and diminution in the quantity of urine eliminated. Similar symptoms may occur from the use of borax in washing out large abscess cavities. Singultus and general motor paralysis are the symptoms in fatal cases. Borax certainly has atoxic action on the kidneys when taken in large amounts. There is albumen in the urine, casts, pain in urination, and even bloody urine. While the kidneys are markedly affected by large doses it is questionable whether borax, in the small amounts used in food preservation, causes any grave symptoms of kidney irritation, even when taken for a considerable length of time. It may well be that certain individuals have an idiosyncrasy to boron salts, in which case their use would prove detrimental. See BORON.

Borchgrevink, Carsten Egeberg, Norwegian explorer and lecturer: b. Christiania, 1864, his mother being English and his father a Scandinavian. He went to sea at an early age, but returned to go to college. In 1898 he went to Australia, joined the survey department, and scaled Mount Lindsay. In 1894-5 he was in Antarctic waters, a region more fully explored by him in 1897, when he attempted to reach the South Pole without success. In 1899 (17 February) he had, however, reached Robertson Bay. Returning to London in 1900 he reported hav-

ing reached lat. 78.50 S.; lon. 195.50 E., the farthest point south ever reached by man. Consult his work, 'First on the Antarctic Continent.'

Borda, Jean Charles, French engineer, and afterward a captain in the French marine, famous for his mathematical talents: b. Dax, department of Landes, 4 May 1733; d. 20 Feb. 1799. In 1756 he was chosen a member of the Academy of Sciences, and occupied himself in making experiments on the resistance of fluids, the velocity of motion, and other topics relating to dynamical science. In 1767 he published a dissertation on hydraulic wheels, and afterward one on the construction of hydraulic machinery. In 1771, with Verdun de la Crenne and Pingré, he made a voyage to America, to determine the longitude and latitude of several coasts, isles, and shoals, and to try the utility of several astronomical instruments. In 1774 he visited the Azores, the Cape Verde Islands, and the coast of Africa for the same purpose. In the American war he was very useful to the Count d'Estaing by his knowledge of navigation. Borda was the founder of the schools of naval architecture in France. He invented an instrument, of a very small diameter, which measures angles with the greatest accuracy, and which has been used in measuring the meridian; the reflecting circle, which has made his name immortal; besides an instrument for measuring the inclination of the compass-needle, and many others. On the establishment of the National Institute, he became one of its members, and was occupied with other men of science in framing the new system of weights and measures adopted in France under the republican government. Among the latest of his labors was a series of experiments to discover the length of a pendulum which should vibrate seconds in the latitude of Paris. The principal of his writings are: 'His Voyage' and his 'Tables Trigonométriques Décimales.'

Bordeaux, France, capital of the department of Gironde, is situated on the left bank of the Garonne, about 70 miles from the sea, and 284 southwest of Paris. It is built in a crescent form round a bend of the river, which is lined with fine quays for more than three miles, and is crossed by a magnificent stone bridge of 17 arches, finished in 1821 at a cost of \$1,200,000. There is another bridge, a fine iron structure, for the railway from Paris. Bordeaux consists of an old and a new town, the boundary between them being formed by a wide and handsome street which, commencing at the quay near the centre of the crescent, stretches across the city from east to west. The objects chiefly deserving of notice in the old town are the arch called the Porte de Bourgogne at the extremity of the bridge, forming the principal entrance to the town; the cathedral, a fine Gothic edifice built at different periods; St. Michael's Church, with a lofty detached tower, and a superb front of florid Gothic; the Church of St. Croix, a specimen of gorgeous Romanesque; the bourse or exchange, the custom-house, the Hôtel de Ville, once the residence of the archbishops of Bordeaux, and the Palais de Justice. The new town is not so rich in public buildings. The most conspicuous are the library (200,000 volumes), the museum, and the theatre, a Grecian structure, regarded as the handsomest edifice

BORDEAUX MIXTURE — BORDEAUX WINES

in Bordeaux. Among the beneficent establishments the first place is due to the grand hospital or infirmary, which occupies the highest site in the town and is admirably arranged. Few cities are so well supplied with extensive and finely planted promenades. Bordeaux is the seat of a court of appeal, of courts of the first instance and of commerce; and has an academy of science, literature, and art; a preparatory school of medicine and pharmacy; a lyceum; a normal school for female teachers; a school of hydrography and navigation; a school of painting and design; a botanic garden, an observatory, various literary and scientific associations and a branch of the Bank of France. There are consuls resident here from all the states of Europe and America. The position of Bordeaux gives it admirable facilities for trade, and enables it to rank next after Marseilles and Havre in respect of the tonnage employed. Large vessels can sail up to the town, which by railway, river, and canal communicates with the Mediterranean, with Spain, and with the manufacturing centres of France. The chief exports are wine and brandy; drugs, dyes, and fruits are also largely exported. Sugar and other colonial produce and wood are the chief imports. Ship-building is the chief branch of industry, and there are also sugar-refineries, woolen and cotton mills, potteries, soap-works, distilleries, etc.

Bordeaux is the *Burdigala* of the Romans. In the 5th century it was in possession of the Goths, and it was pillaged and burned by the Normans. By the marriage of Eleonor, daughter of the last Duke of Aquitaine, to Louis VII., it fell into the hands of France. But in 1152 the princess was repudiated by her husband, and married to Henry of Anjou, who ascended the throne of England in 1154, as Henry II., and transferred Bordeaux to that crown. After the battle of Poitiers, Edward the Black Prince carried John, king of France, prisoner to Bordeaux, where he resided 11 years. Under Charles VII., in 1451, it was restored again to France. In 1548 the citizens rebelled on account of a tax on salt, and the governor, De Morems, was put to death, for which the constable of Montmorency inflicted a severe punishment on the city. During the revolution it was devastated as the rendezvous of the Girondists, by the Terrorists, almost as completely as Lyons and Marseilles. The oppressiveness of the continental system to the trade of Bordeaux made the inhabitants disaffected to the government of Napoleon, so that they were the first to declare for the house of Bourbon, 12 March 1814. The Roman poet, Ausonius, was a native of Bordeaux. Montaigne and Montesquieu were born in the neighboring country, and the latter lies buried there in the Church of Saint Bernard. Pop. (1903) 268,330.

Bordeaux Mixture. See FUNGICIDES.

Bordeaux Wines. The finer red wines of the country around Bordeaux are the best which France produces. They contain but little alcohol, keep well, and even improve by removal. As the original fermentation is complete, they are, if judiciously managed, less subject to disorder and acidity than the Burgundy wines. None of the very best quality, however, is exported pure; a bottle of the best Château-Margaux, or Haut-Brion, is a rarity hardly to be procured in Bordeaux itself, at the rate of six

or seven francs a bottle. For export, the secondary growths of Médoc are mingled with the rough Palus. The red wines of Bordeaux are known in America under the name of claret. They have less aroma and spirit, but more astringency than the Burgundy wines. They are the safest wines for daily use, as they are among the most perfect of the light wines, and do not easily excite intoxication. In this respect they contrast with the Burgundy wines, which have more generous qualities than those of Bordeaux, although these wines have sometimes been accused of producing the gout, but this disparagement is without reason. Persons who habitually drink madeira, port, etc., and indulge in an excess of claret, may indeed be visited in that way; because a transition from the strong, branded wines to the lighter is always followed by a derangement of the digestive organs.

The principal vineyards are those of Médoc, Graves, Palus, and Vignes Blanc'es; after these, those of Entre-deux-Mers, Saint Emilion, and the Bourgeais are the most important. The first growth of Médoc are the famous wines of Château-Margaux, Lafitte, and Latour. The Lafitte is characterized by its silky softness on the palate, and a perfume partaking of violet and raspberry. The Latour is fuller, has more aroma but less softness. The Château-Margaux is lighter than the Latour, and delicate like the Lafitte, but has not so high a flavor. Of the second growth, we may mention the Rauran and the Léoville. The average produce of the first growth is 217,000 gallons. The soil of Médoc is a sandy and calcareous loam. The gravelly lands (*les Graves*) to the south and west of Bordeaux produce the Graves. The first growth of the red Graves is the Haut-Brion, which rivals the first growth of Médoc; it has more color and body, but is inferior in aroma and taste. The principal white Graves are Saint Bris and Carbonieux. The best Médoc ought to be kept three or four years before removal; the Graves five or six. The wines of Palus, which is a bed of rich alluvial deposits, are inferior to the preceding; they are stronger and more deeply colored than those of Médoc. Being hard and rough, they are improved by a voyage, and are principally sent to the East Indies and America as *vins de cargaison*, or are mixed with Médoc which is intended for exportation. By the voyage they become more light and delicate, but are not to be compared with the growths of Médoc and the Graves. The best are Queyries and Mont Ferrand. The former are deeply colored, and have much body. Age gives them an agreeable aroma, resembling that of a raspberry.

Among the white Bordeaux wines, besides those already mentioned, the finest growths are Sauternes, Preignac, Barsac, and Bommes. Martillac and Saint Médard are of a good quality, and have lightness and body. Dariste, formerly Dulamon, is equal to Saint Bris and Carbonieux. Among other red wines are the Bourgeais, which are of a fine color, and acquire by age lightness and an agreeable almond aroma; of all the Bordelais wines they most resemble the Burgundy wines. The first growths are Debusquet, Château-Rousset, Tajac, and Falfax. The Bourgeais wines were formerly preferred to Médoc. The wines of Saint Emilion have been much esteemed. The Fronsac and Canon are the best. Those of Entredeux-Mers become

agreeable with age. The *vins des Côtes* are good *vins ordinaires*; they are generally *fermes* and hard, and improve by age. The best are those of Bassens and Cenon. Consult Henderson's 'History of Ancient and Modern Wines.'

Borden, Simeon, American inventor and surveyor: b. Fall River, Mass., 29 Jan. 1798; d. 28 Oct. 1856. He instructed himself in mathematics and devised successful surveying instruments. The first American geodetic survey was his work. In 1846 he began the construction of railroads.

Bordentown, N. J., a city on the Delaware River, the Delaware and Raritan Canal, and the Pennsylvania R.R.; 57 miles southwest of New York. It is noted as being a former residence of Joseph Bonaparte (q.v.), brother of Napoleon I., and for many years the house and grounds belonging to the estate possessed much interest for the tourist. The city is the seat of the Bordentown Military Institute, the Priscilla Braislín School, St. Joseph's Academy (Roman Catholic), and the Bordentown Female College. There are steam forge and iron works, a foundry and machine shop, worsted mills, shirt factory, canning factories, a shipyard and other industries. Pop. (1900) 4,110.

Border Ruffians, a name given, after the Kansas-Nebraska Bill of 1854, to the pro-slavery Missourians who acted as the allies of the slave element in Kansas, crossing the boundary to vote, by which means they organized the first government against the *bona-fide* free-labor residents by a vote of nearly double the inhabitants of the Territory. They kept the State in anarchy for three years, terrorizing the inhabitants by murder, arson, the sack of towns, and other outrages. The most graphic comment is the fact that they adopted this term of their enemies and prided themselves on it as an excellent joke. See KANSAS-NEBRASKA BILL.

Border States, before the War, the line of slave States lying next the free States: Delaware, Maryland, Virginia, Kentucky, and Missouri. The term was sometimes improperly made to include North Carolina and Tennessee, probably because their mountain districts held so large a proportion of loyalists; and Arkansas, for no special reason. Their political position was dictated by the facts that: (1) After the prohibition of the slave trade one of their chief industries was breeding slaves for exportation to the cotton, rice, and sugar plantations of the southernmost States. In the Virginia convention of 1832 it was said to be the most profitable in the State. (2) From their position they were the chief sufferers from the escape of fugitive slaves; in 1850 this was estimated at a loss of \$3,000,000 a year, and these States were the most insistent advocates of the Fugitive Slave Law and its enforcement; and in 1860 a Missouri senator urged the creation of a Federal police to patrol the border line for this purpose. (3) In case of war they would be the chief battlefield. They therefore furnished the backbone, if not the genesis of every political movement to stop the slavery agitation or conciliate the sections. The strength of the Know-Nothing party of 1856 and the Constitutional Union party of 1860 (Bell-Everett) was almost exclusively in the border States; the Peace Conference of 1861 and the proposed Crittenden Compromise were the work of these States. They tried to prevent the

outbreak of hostilities, and when the war began the governor of Kentucky went so far as to attempt making his State a neutral power outside both governments, and forbade either of them occupying it without the consent of the State authorities. Finally, however, they split up according to their natural affinities; the three not border States at all—North Carolina, Tennessee, and Arkansas—seceded, with Virginia; while in Kentucky, Maryland, Delaware, and Missouri, the loyal element, with government help, prevented the State from going out. They never gave up hope through the war, however, of reconciling differences by a convention of all the old States, North and South.

Border War, a name given during the struggle for Kansas to the intermittent civil war in that Territory, about 1854-8, between the free-soil and the slavery parties. It was begun by the attempt of the Missouri slaveholding party ('Border Ruffians,' q.v.) to reclaim by violence what the actual settlers had won by colonization; many of the worst atrocities were perpetrated, and all the temporary success of the slavery side won, by bodies of men who were not residents of Kansas at all. This stirred up John Brown (q.v.) to move there from northern Ohio with his sons, and fight against them. Of the other partisan leaders on that side, the most notable was James Montgomery, who, however, was a *bona fide* settler. The most efficient leaders among the Missourians, or border ruffians, were James R. Atchison of Missouri and the Federal courts.

Bordighera, Italy, a town on the Mediterranean coast, in the district of San Remo and province of Porto Maurizio, a favorite winter residence for invalids, having been made fashionable by the visits of the members of the English royal family. Few places on the Riviera are better fitted for the accommodation of invalids and tourists. In addition to the usual facilities for the entertainment of strangers, the town has a library, museum, and a theatre. Pop. (1903) about 6,000.

Bordone, Paris, Italian painter of the Venetian school: b. Treviso, 1500; d. 1570. Under Titian he made rapid progress in painting. The execution of many works for his native city and for Venice spread his fame as far as France, whither he was invited by the king. The galleries of Dresden and Vienna possess several of his pieces. His most famous picture is the 'Old Gondolier Presenting a Ring to the Doge'; it is considered one of the masterpieces of the Venetian school. Other examples of his work are: 'Prophecy of the Tiburtine Sibyl,' in Florence; 'Combat of the Gladiators,' in Vienna, and 'The Chess Players,' in Berlin.

Bore, a word probably of Icelandic origin, and used to designate a very remarkable phenomenon which occurs in some rivers in spring-tides. At such times as the tide advances the water is suddenly thrown in as if in a mass, and then pursues its course up the river, and in opposition to the current, presenting a volume of water moving with great rapidity and irresistible force, and with a height varying from two or three feet, as in the Severn, Trent, Solway, and Dee, to more than 12 feet in the Brahmaputra, and Tsien-Tangkiang. The last is said

BORE — BORGHESE

to have a rise of 20 feet, and advances with a loud roar, at the rate of 10 miles an hour. The tide in the Bay of Fundy rises with great rapidity, and is sometimes spoken of as the bore of Fundy. The circumstances in which the bore occurs afford an easy explanation of its cause, and show that it is produced by the disproportion between the volume of the tidal wave and the receiving power of the rivers into which it is thrown.

Bore, the cavity of a steam engine cylinder, pump barrel, pipe, cannon, barrel of a fire-arm, etc. In mechanics it is expressed in inches of diameter; in cannon formerly in the weight in pounds of solid round shot adapted thereto, but since the introduction of modern rifled ordnance of the breech loading pattern, the bore of cannon is always expressed in inches of diameter or in the equivalent of inches.

Boreas, the north wind, worshipped by the Greeks as a deity; residing in Thrace, and represented with wings, which, as well as his hair and beard, were full of flakes of snow; instead of feet he had the tails of serpents, and with the train of his garment he stirred up clouds of dust. Boreas was the son of Astræus and of Eos. When Apollo and his favorite Hyacinthus were once playing at quoits, he blew the quoit of the former, of whom he was jealous, upon the head of the youth, who was killed by the blow. By Oreithyia, daughter of Erechtheus of Athens, he was father of Cleopatra, Chione, Calais, and Zetes. The last two took part in the Argonautic expedition.

Borecole, a pot-herb. See KALE.

Boregat. See ROCK TROUT.

Borelli, Giovanni Alfonso, Italian physician and scientist: b. Naples, 1608; d. Rome, 31 Dec. 1679. After studying medicine he both practised and professed it at various places, but particularly at Pisa and Florence, and distinguished himself as the leader of those who have been called mathematical physicians, from regarding the human body as a kind of hydraulic machine, and then attempting to explain all its motions and functions in accordance with the principles of mathematics. He appears to have possessed very original and inventive powers, and made various discoveries, among which may be mentioned that of an apparatus apparently of the nature of a diving-bell, by which persons could descend into the water, remain in it and move about or rise and sink at pleasure, and of a boat by which two or more persons might row themselves beneath the water in any direction. His works discuss many important subjects in medicine, mathematics, and philosophy; but the great work on which his fame rests, though not published till after his death, is entitled 'De Motu Animalium,' and in so far as it relates to mere animal mechanics is full of interest and instruction; but when he attempts to apply his mathematical principles he falls into egregious blunders, and stumbles at every step.

Borelli's Comet. See COMET.

Borer, Round-headed and Flat-headed, insect enemies of several trees. See APPLE.

Borghese, the name of a patrician family of Sienna, Italy, which has been more or less distinguished since the middle of the 15th cen-

tury. A jurisconsult, of the name of Marco Antonio Borghese, who was employed by the papal court in the early part of the 16th century, appears to have laid the foundation of its fortunes at Rome. His third son, Camillo, became Pope Paul V. (q.v.), in 1605, and he lavished the honors and riches which his place enabled him to command on his relatives. For a son of his elder brother, named Marco Antonio Borghese, he procured the principedom of Sulmona and a grandeeship in Spain. His brother, Francesco, he made the leader of the troops sent against Venice in 1607, to maintain the papal cause against the opposition of that republic. Scipione Caffarelli, a nephew, he created cardinal. Paolo, the son of Marco Antonio, married Olympia Aldobrandini, the only child of the prince of Rossano, and grandniece of Clement VIII., and thus introduced the wealth of the Aldobrandini into the Borghese family. The son of Paolo, named Giovanni Battista, was the ambassador of Philip V. to the court of Rome, where he died in 1717. His son, Marco Antonio, was viceroy of Naples in 1721, and another of the same name, descended from him, became a noted collector of works of art, with which he adorned his sumptuous villa on the Pincian hill. See BORGHESE, CAMILLO PHILIP.

Borghese, Camillo Philip Louis, formerly Duke of Guastalla, Prince of France, etc.: b. 1775; d. Florence, 10 April 1832. When the French invaded Italy he entered their service, and showed great attachment to the cause of France, in particular to Gen. Bonaparte, whose sister, Marie Pauline (q.v.), he married. In 1804 he became a French prince, and grand cross of the Legion of Honor, and at the breaking out of the war against Austria in 1805, commander of a squadron of the imperial guard. After its termination his wife received the duchy of Guastalla, and he was created Duke of Guastalla. After having served in 1806 in the campaign against the Prussians and Russians, and after having been sent to Warsaw to prepare the Poles for a revolt, the emperor appointed him governor-general of the provinces beyond the Alps. He fixed his court at Turin, and became very popular among the Piedmontese. After the abdication of Napoleon he broke up all connection with the Bonaparte family, and separated from his wife. The prince sold to the French government for the sum of 8,000,000 francs 322 works of art which ornamented the palace of his ancestors, known under the name of the Villa Borghese. Among them were several masterpieces: for example, the 'Borghese Gladiator,' the 'Hermaphrodite,' the 'Silenus,' the 'Dying Seneca,' 'Amor and Psyche.' Bonaparte provided for the payment out of the national domains in Piedmont, which the king of Sardinia confiscated in 1815; at the same time, in consequence of the second invasion of France, the prince received back part of these treasures of art. In 1818 he sold Lucedio, in Savoy, for 3,000,000 livres. In the kingdom of Naples he possessed the principalities Sulmone and Rosano. He was one of the richest Italian princes.

Borghese, Marie Pauline (PRINCESS), sister of Napoleon: b. Ajaccio, 20 Oct. 1780; d. 9 June 1825. When the English occupied Corsica in 1793 she went to Marseilles, where she was on the point of marrying Fréron, a member of the Convention, and son of that critic whom

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Voltaire made famous, when another lady laid claim to his hand. The beautiful Pauline was then intended for Gen. Duphot, who was afterward murdered at Rome in December 1797; but she bestowed her hand from choice on Gen. Leclerc, then at Milan, who had been in 1795 chief of the general staff of a division at Marseilles, and had there fallen in love with her. When Leclerc was sent to St. Domingo with the rank of captain-general, Napoleon ordered her to accompany her husband with her son. She embarked in December 1801, at Brest, and was called by the poets of the fleet, the Galatea of the Greeks, the Venus Marina. Her statue, in marble, as Venus, was made by Canova at Rome—a successful image of the goddess of beauty. She was no less courageous than beautiful, for when the negroes under Christophe stormed Cape François, where she resided, and Leclerc, who could no longer resist the assailants, ordered his lady and child to be carried on shipboard, she yielded only to force. After the death of her husband she married at Morfontaine, in 1803, the Prince Camillo Borghese (q.v.). Her son died at Rome soon after. With Napoleon, who loved her tenderly, she had many disputes and as many reconciliations, for she would not always follow the caprices of his policy. Yet even the proud style in which she demanded what her brothers begged made her the more attractive to her brother. Once, however, when she forgot herself toward the empress, whom she never liked, she was obliged to leave the court. She was yet in disgrace at Nice when Napoleon resigned his crown in 1814, upon which occasion she immediately acted as a tender sister. Instead of remaining at her palace in Rome, she set out for Elba to join her brother, and acted the part of mediatrix between him and the other members of his family. When Napoleon landed in France she went to Naples to see her sister Caroline, and afterward returned to Rome. Before the battle of Waterloo she placed all her diamonds, which were of great value, at the disposal of her brother. They were in his carriage, which was taken in that battle, and was shown publicly at London. He intended to have returned them to her. She lived afterward separated from her husband at Rome, where she occupied part of the palace Borghese, and where she possessed, from 1816, the Villa Sciarra. Her house, in which taste and love of the fine arts prevailed, was the centre of the most splendid society at Rome. She often saw her mother, her brothers Lucien and Louis, and her uncle Fesch. When she heard of the sickness of her brother Napoleon, she repeatedly requested permission to go to him at St. Helena. She finally obtained her request, but the news of his death arrived immediately after. At her death she left many legacies, and a donation, the interest of which was to enable two young men of Ajaccio to study medicine and surgery. The rest of her property she left to her brothers, the Count of St. Leu and the Prince of Montfort. Her whole property amounted to about \$500,000.

Borghesi, Bartolommeo (COUNT). Italian numismatist: b. Savignano, 11 July 1781; d. 16 April 1866. His attention was devoted to elucidating, through the study of inscriptions, several obscure points in Roman history; and the books he published secured for him a great

reputation among the learned. He completed, after more than 30 years' labor, a full chronological list of the Roman consuls, embracing all the modern discoveries on the subject, with disquisitions on the most important questions connected with Roman antiquities. After his death a complete collection of his writings was ordered by the Emperor Napoleon, but it was not until 1897 that the work was finished.

Borgi, Giovanni, jō-văn'nē bôr-jê, the originator of ragged schools: b. Rome, about 1736; d. about 1802. He was a mason by trade, and after his daily toil was completed, he was in the habit of attending the sick in the hospital of Santo Spirito, spending entire nights in his labor of love, and frequently falling asleep at his work during the day. In his daily walks he had noticed troops of vagrant children in the streets, fast ripening into vice and crime. He took them home to his humble lodgings, and, having clad them with the aid of alms which he collected, he apprenticed them to useful trades. This noble work was observed and admired by others, who freely lent their aid, and in due time a society was formed, which was further developed in 1784. Although Giovanni was himself entirely uneducated, he perceived the advantages of instruction, and caused the children to be taught reading, writing, and arithmetic by one Francesco Cervetti, who afterward left him and founded another refuge for orphans called the "Assumption of the Virgin," which was consolidated with that of Giovanni in 1812. Pius VI. purchased for the institution the Palazzo Ruggi, and became the society's principal protector. Subsequently the charity was removed to different convents, and finally to the church of St. Anne of the Carpenters.

Borgia, Cesare, chā-ză'rê bôr'jâ, Italian ecclesiastic and soldier: b. 1476; d. 12 March 1507. He was the natural son of Rodrigo Borgia, and a Roman lady named Vanozza. His father, who in 1492 became Pope, with the title of Alexander VI., made him a cardinal. When Charles VIII. of France made his entry into Rome, Alexander was obliged to treat with him, and delivered Cesare Borgia into his hands as a hostage, though he escaped a few days after from the camp of the king. In 1497 Alexander bestowed the duchy of Benevento, together with the counties of Terracina and Pontecorvo, on his eldest son, Giovanni, who had already received from the king of Spain the duchy of Gandia. Giovanni died shortly after his investiture, and Cesare has been accused of murdering his brother out of jealousy, but historical proof of this charge is utterly lacking. His father permitted him to abandon his ecclesiastical office and devote himself to the profession of arms, and sent him to France to carry to Louis XII. the bull for divorce and dispensation for marriage which he had long desired to obtain. Louis rewarded Borgia with the duchy of Valentinois, a body-guard of 100 men, and 20,000 livres a year, and promised to aid him in his projects of conquest. In 1499 Cesare married a daughter of King John of Navarre, and accompanied Louis XII. to Italy. He first undertook the conquest of Romagna, expelled the lawful possessors of the land, caused them to be treacherously murdered, and himself, in 1501, to be appointed by his father Duke of Romagna. In the same year he wrested the

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principality of Piombino from Jacopo d'Apiano. He also endeavored, though in vain, to make himself Duke of Bologna and Florence. In 1502 he announced that he was about to attack Camerino, and demanded for that purpose soldiers and artillery from Guidobaldo of Montefeltro, Duke of Urbino. Camerino was taken by storm, and Giulio di Barona, the lord of the city, with both his sons, was strangled at the command of Borgia. Meanwhile all the petty princes had united and collected soldiery for their defense; but Cesare Borgia terrified some by means of 3,000 Swiss whom he called to Italy, and gained over others by advantageous offers. Thus he dissolved their alliance, seized their lands, and saw no further obstacle to his being made, by his father, king of Romagna, of the March, and of Umbria, when Alexander VI. died, 17 Aug. 1503. At the same time Cesare Borgia was attacked by a severe disease at a moment when his whole activity and presence of mind were needed. He found means, indeed, to get the treasures of his father into his possession, assembled his troops in Rome, and formed a closer alliance with France; but enemies rose against him on all sides, one of the most bitter of whom was the new Pope, Julius II. Borgia was arrested and carried to Spain, where he remained for two years in prison. He at length made his escape to his brother-in-law, the king of Navarre, went with him to war against Castile, and was killed by a shot before the castle of Viana.

Borgia, Francisco, frān-thēs'kō, or **St. Francis** (DUKE OF GANDIA), Spanish ecclesiastic: b. Janda, Spain, 1510; d. Rome, October 1572. He was eminent as a soldier and statesman, and enjoyed the confidence and friendship of Charles V., who appointed him viceroy of Catalonia. While very young he married a noble Portuguese lady, Eleonora de Castro, by whom he had a large family. He was always very strict in his morality, and exact in his religious duties. After the death of his wife he entered the Society of Jesus, and was ordained priest in the 40th year of his age. At the death of Laynez, in 1565, he was elected General of the society, and remained in office until his death. Several bishoprics, and the dignity of cardinal, were repeatedly pressed upon him, but he refused them all. He was canonized by Clement X. in 1671.

Borgia, Lucrezia, loo-krād'zē-ä, daughter of Pope Alexander VI., and sister of Cesare Borgia (q.v.): b. 1480; d. Ferrara, 24 June 1519. When a mere child she was betrothed to a gentleman of Aragon, but her father, on attaining the popedom, thought the match beneath her, and broke the engagement, marrying her to Giovanni Sforza, lord of Pesaro. After she had lived with him for four years, Alexander dissolved the marriage on the ground of the husband's impotency, and gave her to Alphonso, Duke of Bisceglia, natural son of Alphonso II. of Aragon. Two years after her husband was assassinated in a quarrel with Cesare Borgia. Within the course of a year she married Alphonso d'Este, son of Ercole, Duke of Ferrara. Here she became a liberal patroness of poets, who endeavored to repay her benefactions by lauding her as the pattern of every virtue. The character of Lucrezia Borgia has been the subject of much controversy, but recent historical

researches have placed her in a much fairer light and it has been shown beyond dispute, that after her marriage to Alphonso d'Este her life was a model of virtue and beneficence.

Borgia, Rodrigo. See ALEXANDER VI.

Borgia, Stefano, stē-fā'nō, Italian ecclesiastic: b. Velletri, 3 Dec. 1731; d. Lyon, 23 Nov. 1804. He was brought up by his uncle, Alexander Borgia, Archbishop of Fermo, and in 1750, on becoming a member of the Etruscan Academy of Cortona, commenced at Velletri to form a museum which has since become one of the richest private collections in existence. In 1759 he was appointed by Benedict XIV. governor of Benevento, and in 1770 he became secretary to the College of Propaganda, which brought him into immediate relation with missionaries to all parts of the world, and enabled him, at comparatively little expense, to enrich his museum with manuscripts, coins, statues, idols, and all the other rarities which each country possessed. In 1789 Pius VI. made him a cardinal, and at the same time appointed him inspector-general of the foundling hospital, into which he introduced extensive reforms. In 1797 the revolutionary spirit which had broken out in France extended itself to Rome, and the Pope, as the best means of counteracting it, gave all his confidence to Borgia and installed him as dictator. The situation was extremely difficult, but he showed himself worthy of the trust, and gained such ascendancy over the public mind that tranquillity and good order remained uninterrupted till 1798. By this time the French were at the gates, and the popular party, becoming dominant, established a republic. The Pope was compelled to depart, and Cardinal Borgia, at first arrested, was ordered, on obtaining his liberty, to quit the papal states. After disembarking at Leghorn he repaired to Venice and Padua, and continued regularly to discharge his functions in connection with the Propaganda as if nothing had occurred to interrupt them. He returned to Rome with the new Pope, Pius VII., who treated him with the same confidence as his predecessor. Afterward, when Pius VII. was carried off to France, Borgia was ordered to accompany him, and he accordingly set out, but had only reached Lyons when he was seized with a serious illness, and died. He was the author of several antiquarian and historical works, and deserves honorable mention for his liberal patronage of arts and artists.

Borgne, bôr-nê, Lake, Louisiana, a body of water situated in the southeastern part of the State. Though termed a lake, it is strictly the termination of that large arm of the Mexican Gulf known as Pascagoula Sound, being united to that by a pass or strait crossed by a line of small islands and faced on the east by Grand Island. Lake Borgne is also connected with Lake Pontchartrain by the Rigolet Pass. It is about the average depth of Lake Pontchartrain, and approaches within 15 miles of New Orleans. Its greatest extent is in a northeast and southwest direction, in which its length is about 30 miles. Lake Borgne forms a part of the western boundary of the Mississippi Delta.

Borgognone, Jacopo Cortesi, yä-kō-pō kôr-tä-zē bôr-gō-nyō-nê, French painter: b. St. Hippolite, Burgundy, 1621; d. 1676. He

studied painting under his father, but enlisted in the army and remained in it for three years. On his return he resumed his art, and went to Bologna where he attracted the notice of Guido and became an inmate in his house, where he made good use of the valuable opportunities of improvement thus afforded him. After realizing an independence he visited his native place. Returning again to Italy, where he painted with much success, he resolved to become a Jesuit. He was accordingly admitted into the order at Rome in 1655, but he appears to have painted as diligently as ever. He is remarkable for freedom of design, and the vividness with which his pictures bring the subjects which they represent before the mind.

Borgu, bôr-goo', Africa, a district in the Western Sudan, lying about lat. 10° N., and stretching from the meridian of Greenwich east to the Niger. It is hilly in parts, but much of it is well watered and extremely fertile. Among its numerous productions are rice, grain, indigo, cotton, bananas, and citrons. The inhabitants are Mohammedan. Kiama and Wawa are chief towns.

Bo'ric Acid. See BORACIC ACID.

Boring, a species of circular cutting in which a cylindrical portion of a substance is gradually removed. When tubes of metal are to be formed, a cast is, in some cases, made in solid metal, and the whole of the bore is produced by the boring-machine: in others the cast is made hollow at first, and the borer is only used to give uniformity and finish to the inside of the tube. In boring cannon sometimes the tool is made to revolve while the cannon is at rest, and sometimes the cannon is made to revolve while the tool is at rest. By the latter arrangement the bore is said to be formed with more accuracy than by the other method of putting the borer in motion.

In the jewelry and small metal industries, hand drills, which consist of a spindle with steel bits, to which reciprocating rotation is given, are the implements for piercing small holes. The boring of holes in metal plates is effected by means of drills driven by machinery. The drill is inserted in the end of a vertical spindle, which revolves in a fixed frame and is driven by the bevel wheels. The metal to be bored is placed on a table or other support, below the drill; and the up and down motion, or end pressure and off action, of the drill is effected by the hand gear turning the screw; which, being coupled to the top of the spindle, presses it down or raises it, according to the way it is turned. The spindle slides vertically in the collar forming the axis of the bevel wheel, but is carried round with it by means of a pin which projects into a groove.

As applied to the earth and to rocks, boring embraces two classes of operations — boring of shot-holes for blasting, and the sinking of bores in prospecting for minerals and in forming wells for water, brine, and mineral oils. Blast-holes in rocks are made from one to two — sometimes more — inches in diameter, and may pierce to the depth of nine feet. Such holes are most simply made in hard rock by a steel-pointed drill, struck by a hammer, and turned partly round after each blow to make the hole cylindrical. The addition of a little water serves to preserve the temper of the boring tool, and

makes the rock more easy to cut. In soft rock, whenever the hole is to be vertical, a *jumper* is used. This is a weighted drill, which acts merely by its own weight when let fall from about a foot in height. The powdered stone is removed at intervals by a scraper. But in all great engineering undertakings rock-boring machinery now supplants hand work. The machines are principally devised to imitate the percussive action of the hand drill, the boring chisel being worked and rotated by compressed air, and sometimes directly by steam. The compressed-air machines possess the great advantage of aiding in the ventilation of the working — often a most important consideration, seeing the operations are chiefly carried on in confined spaces where large volumes of poisonous gases are evolved from explosions. The earliest practical rock-boring machine was that of Sommeiller, one of the engineers of the Mont Cenis tunnel, at which undertaking the apparatus was first used. Now the forms of percussion machines are very numerous, improvements being directed toward lightness and simplicity of parts, and to the method — automatic or otherwise — of advancing the boring-tool as the work proceeds. Among the best known machines are the Barrow, Burleigh, Darlington, Ferroux, Ingersoll, and McKean rock-borers. Diamond drills working in the manner described below are also used. Brandt's rotatory borer is an apparatus similar in action to the diamond drill, but with a crown of hardened steel in place of cutting diamonds. The tool is pressed against, and rotated by water power. An apparatus similar in principle to the brace and bits of the carpenter is used with advantage in uniform rock, such as slate.

The bores for deep wells of all kinds, and for discovering the mineral contents of a region, come under one category. As a preliminary operation in mining, boring is of the utmost importance for discovering the position, thickness, and dip of mineral strata or lodes, and for ascertaining the nature of the overlying deposits. Bores are made by three classes of implement — (1) boring-rods, (2) rope borers, and (3) diamond drills.

The rod-boring instrument consists of an iron shank having a cross-bar at the top and a hollow screw at the bottom; to this all the successive boring instruments are fastened. A simple chisel is first attached to the screw, and one or two men press upon the cross-bar, and, at the same time, force it round like an auger; while another workman, by means of a lever erected overhead, with a chain descending from it to the cross-bar, gives an up-and-down motion to the instrument. When the chisel becomes clogged, from the accumulation of material which it has loosened, it is exchanged for a cylindrical auger, provided with a valve, which scoops out the separate material; and thus by alternate chopping and scooping the work is carried on. The nature of the strata is determined with considerable facility and certainty by examining the fragments brought up by the auger. As the work advances, successive lengths of rod are screwed on at the upper end. A derrick pole is erected over the bore hole for the purpose of elevating the rods, to permit the change of the tools.

The rope method of boring has been long in use among the Chinese. By it the great loss of time arising from the screwing and unscrewing

of the rods at each elevation of the chisel or auger is saved. The chisel and scooping instrument are fastened to a rope, which is alternately elevated and allowed to descend by the simple force of gravity; the instrument thus forces its way through the ground. In the softer rocks of the newer formations this method has been successfully employed in boring for artesian wells. The rope-boring machinery of Mather and Platt, of Salford, England, in which a flat hempen rope is employed, is in extensive use.

For deep well-sinking, as in the Pennsylvania oil region, where depths of 2,000 feet and more have to be reached, and for mineral prospecting, the diamond drill has of late years largely superseded all other borers. With this apparatus the earth can be pierced at any angle, which is a great advantage in investigating mineral deposits; and, moreover, the drill produces solid and continuous cores of the strata through which it passes, so that a complete section of any bore can be exposed to view. The diamond drill consists of a crown, or cylinder of steel, around one edge of which are fixed a series of black diamonds. These diamonds are so set that they project alternately a little beyond the outside and inside edge of the cylinder. This crown is screwed to lengths of iron tubing as it cuts its way by rotation into the rock, and it makes, as it descends, an annular cutting somewhat larger than the thickness of the continuous tube, which the crown and its shaft form. Thus a core of rock is cut out and held within the tube, and the pieces may be lifted out from time to time as the work proceeds. The detritus resulting from the abrasion of the ring of rock is continuously washed away by a current of water, forced down within the tubing. Diamond drills are made of many sizes, from $1\frac{1}{4}$ up to 18 inches in diameter. The prototype of the diamond drill was M. Fauvelle's hollow boring-rod with steel crown, described at the British Association meeting in 1846.

Borissoglebsk, bō-rē'sō-glěpsk, a town in the government of Tambof, about 120 miles southeast of the town of that name, and capital of the government. From its situation and water communications it is the centre of a very large trade. It is the seat of an annual fair, and has woolen and iron manufactures. Pop. about 25,000.

Borissov, bō-rē'sof, Russia, a town in the government of Minsk, 50 miles northeast of the town of that name, on the left bank of the Berezina. Not far from it took place the disastrous passage of the Berezina by the French in 1812. Pop. about 15,000.

Börjeson, Johan Helenus Laurentius, yō-hän ēl-ā'nūs lō-rēn'shē-ūs bē'r'yē-sōn, Swedish sculptor: b. Halland, 1835. He studied at Rome and Paris, and in 1879 became professor at the Art Academy of Stockholm. His work includes both portrait-statues and ideal subjects, in which he unites fidelity to nature with love of beauty. Among his works are 'The Bowler'; 'The Fisher Boy of Capri'; 'Youth with a Tortoise'; and the statues of the poet Holberg at Bergen, of the historian Geiger at Upsala, of Axel Oxenstiern at Stockholm, and of King Charles X. Gustavus at Malmö.

Borland, Solon, American senator: b. Virginia; d. Texas, 31 Jan. 1864. He was educated in North Carolina, studied medicine and settled

in Little Rock, Ark. During the Mexican war he served as major in Yell's cavalry, and was taken prisoner in January 1847. After his discharge in June 1847 he served as a volunteer aid to Gen. Worth until the end of the campaign. After serving in the United States Senate (1848-53), he was appointed minister to Central America. When returning to the United States after his resignation he was assaulted at San Juan de Nicaragua for interfering to prevent the arrest of a person charged with murder at Puntas Arenas. For this insult the sloop-of-war Cyane bombarded and destroyed the town, under instructions from the United States government, 13 July 1854. During the Civil War he was a brigadier in the Confederate service, and before his State seceded, raised troops and seized Fort Smith, by order of Gov. Rector, 24 April 1861.

Borlase, William, English mineralogist and antiquarian: b. Pendeen, Cornwall, 1696; d. 1772. He studied at Oxford, entered orders, and became successively rector of Ludgvan and vicar of St. Just. The richness of Cornwall in mineral products and antiquities gave a direction to his studies, and he began making collections with the view of afterward giving a description of his native county. In 1750 he was elected a Fellow of the Royal Society, to which he had communicated a valuable paper on the spars and crystals of the Cornish mines, and for many years after he continued to write in its 'Transactions.' In 1754 he published his 'Antiquities of Cornwall,' and in 1758 he completed the work by publishing his 'Natural History of Cornwall.' He died in 1772. He kept up a correspondence with the most eminent men of his day, and was on intimate terms with Pope, whom he furnished with materials for his grotto at Twickenham. Dr. Borlase's name, formed out of crystals, is still to be seen there.

Bormann, bōr'män, Edwin, German poet: b. Leipsic, 14 April 1851. He was educated at the Polytechnic Institute of Dresden, and at Leipsic and Bonn. His first success was won by a series of humorous poems in the Saxon dialect which appeared in the 'Fliegende Blätter.' His other works are in High German; they include 'Seid umschlungen, Millionen,' a book of humorous songs, 'Schelmenlieder'; 'Das Büchlein von der Schwarzen Kunst,' 'Liederhort in Sang und Klang,' and 'Klinginsland, Minnelieder und Spielmannsweisen.'

Bormio, bōr'mē-o (Ger. WORMS, VOORMZ), Italy, a town in Lombardy, near the Adda; pop. about 2,000. In its vicinity are the salt baths called Bagni di Bormio. The temperature is 99° 5'. Gen. Dessolles achieved here a victory over the Austrians, 26 March 1799. The beautiful galleries of the road which leads over the Wormser Joch (an Alpine mountain), from Tyrol to Italy, were destroyed by the Italians in 1848.

Born, Bertrand de, bār-trōn dē bōrn, French troubadour and warrior: b. in the Castle of Born, Périgord, 1140; d. about 1209. He dispossessed his brother of his estate, whose part was taken by Richard Cœur de Lion in revenge for De Born's satirical lays. Dante places him in the 'Inferno' on account of his verses intensifying the quarrel between Henry II. and his sons.

Börne, Ludwig, lood'vīg ber'ne, German political writer: b. Frankfort-on-the-Main, of Jewish parents, 6 May 1786; d. Paris, 12 Feb. 1837. He founded, and for three years conducted, *Die Wage*, a journal devoted to civics, science, and art. Of his numerous satirical sketches, all full of humor and wit, these are perhaps the most brilliant: 'Monograph on the German Postal Snail,' 'The Art of Becoming an Original Author in Three Days,' 'Memorial Address to Jean Paul.' Fierce animosity toward the dynastic policies of Germany permeated whatever he wrote; even his literary and dramatic criticism was biased by this passion. His last completed work, 'Menzel, the French Devourer' ('Franzosenfresser'), is proof that to the last his voice was still for war. His 'Complete Works,' in 12 volumes, were published in 1863.

Bor'neëne. See BORNEOL.

Borneil, Giraud de, zhê-rō dè bôr-nâ-ê, a Provençal troubadour of the 12th century: a native of Exideuil, Dordogne. His contemporaries bestowed on him the sobriquet "Master of Troubadours." Some 80 of his songs are extant; among them the charming song of the morning, "Alba."

Bornemann, Wilhelm, vil'hēlm bôr'ne-mān, German dialect poet: b. Gardelegen, 1766; d. 1851. He is one of the foremost representatives of modern Low German poetry. His works are 'Low German Poems' (1810), republished in a 10th edition in 1891; 'Pictures of Nature and the Chase' (1829); 'Humorous Hunting Songs.'

Borneo (corrupted by the Portuguese from Bruni or Brunei, the name of a state on its northwest coast), one of the islands of the Malay archipelago, and, next to Australia and New Guinea (but not much smaller than the latter), the largest island in the world. On the south it has the Java Sea; on the east the Strait of Macassar and the Sea of Celebes; on the north the Sulu Sea; on the west and northwest the China Sea. Its circumference is about 3,000 miles, its greatest length, 780 miles, and its greatest breadth 690 miles; area, according to recent calculation, 283,358 square miles. Its outline is but slightly indented by bays and inlets; and yet the skeleton of its mountain ranges, now well ascertained by the travels of Dalton, Low, Burns, and Schwaner, show that at not a very remote period it must have presented the same singular configuration with Celebes and Gilolo—that of a group of peninsulas. Starting from the central mountains, the Anga-anga group, and proceeding northeast, we trace a chain, terminating in Kinibaloo (11,000 feet high, the highest peak in Borneo), which forms the backbone of the peninsula. Hardly half of the island is good terra firma, habitable for man. An alluvial marshy band, varying from 30 to 50 miles in width, surrounds the island, the only avenues to the interior being its numerous rivers and streams. The mouths of 23 rivers, all navigable on an average 100 miles for vessels drawing not more than 12 feet of water, can be counted along the northwest coast, between Capes Sampanmanjo and Datoo. Berow and Coti rivers on the east, Banjar, Murong, Kahajan, and Mendawei rivers on the south, and the rivers Pontianak and Sambas on the west are large streams with tides flowing

far up, and some of them navigable for 200 miles. Innumerable smaller streams flow from the great water-sheds.

In connection with the river systems there are numerous lakes in Borneo; but of true mountain lakes on a large scale there are probably few. The great lake of Kinabalu, which figured in older accounts, with 100 miles of circumference, is a pure myth, based perhaps on a misunderstood description of the great grass-covered plain of Danao.

Meteorological Conditions, Products, etc.—The climate in the low grounds is humid, hot, and unhealthy for Europeans; but in the higher parts toward the north the temperature is generally moderate, the thermometer at noon varying from 81° to 91° F. During the rainy season, from November to May, heavy storms of wind with loud thunder are experienced on the west coast. The influence of the land and sea breezes passes inland to quite remarkable distances across the level plains and up the river valleys. Vegetation is extremely luxuriant. The forests produce ironwood, bilian, teak, ebony, sandalwood, gutta-percha, dye-woods, benzoin, wax, dragon's-blood, sago, various resins, vegetable oils, and gums. The camphor of Brunei is the best in Asia. The mohor-tree, well adapted for making native boats, attains a height of 80 feet, and the kaladang, suited for large masts, of 200 feet. Nutmegs, cloves, cinnamon, pepper, betel, ginger, rice, millet, sweet potatoes, yams, cotton in Amuntai, sugar-cane in Sambas and Montrado, indigo, tobacco, coffee in Sambas, pineapples, cocoanuts, etc., are cultivated. The mountains and forests contain many monkeys, among which is the orang-outang. Tapirs, a small kind of tiger, small Malay bears, swine, wild oxen or banteng, and various kinds of deer abound. The elephant is found only in the north and the rhinoceros in the northwest. The few domesticated animals are buffaloes, sheep, goats, dogs, and cats. A few horses are seen in Banjermassin. Among the birds are eagles, vultures, argus pheasants, peacocks, flamingoes, pigeons, parrots, and also the swifts (*Collocalia esculenta*) which construct the edible nests prized by the Chinese for making soup. The rivers, lakes, and lagoons swarm with crocodiles, and many kinds of snakes, frogs, lizards, and leeches. Fish is plentiful, and the coasts are rich in tortoises, pearl mussels, oysters, and trepang. Brilliant butterflies and moths are in great variety. Among the mineral products are coal, gold, and copper, especially in Montrado; antimony, iron, tin, platina, nickel, diamonds and other precious stones, rock crystals, porcelain clay, petroleum, and sulphur. The diamond mines are chiefly in Landak and Pontianak; Sambas produces the greatest quantity of gold; the kingdom of Brunei, Kutei, and Banjermassin, the largest amount of coal. The Pengaron coal field, worked by the Dutch government, is one of the most important.

Population.—The population consists of three classes, the Dyaks or Dayaks, who are the aboriginal heathen inhabitants and constitute the great bulk of the population; the Mohammedans or Malays—for this name is extended so as to include all professors of Islam, whether true Malays, Buginese, Javanese, Dyaks, or Arabs; and the Chinese. The Dyaks live chiefly in the interior, and employ themselves

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with tillage and the collecting of gutta-percha, resin, gums, rattans, gold dust, and wax. They are divided into numerous tribes. The Malays (taking the name ethnographically) dwell on the coasts, are traders and bold sailors. They are more civilized than the Dyaks, cultivate the grounds around their houses, lay out gardens, keep cattle, and live partly by fishing. The Chinese, chiefly from Canton, have penetrated far into the interior. They engage in trade and mining, are unwearied in their efforts to make money, and then return to their native country. They have always endeavored to live as independent republics (*kong-si*) under chiefs chosen by themselves, and according to Chinese laws. In 1857 the Chinese living in Sarawak rebelled, and were nearly exterminated. The Dutch were also compelled to put them down by force of arms, and have imposed a poll tax. The women of Borneo, except the Dyak, weave cotton fabrics, make earthenware, baskets, and mats of beautiful designs and colors. In the district of Banjarmassin are factories of weapons. The principal exports are gold, gold dust, diamonds, coal, rattans, gutta-percha, edible nests, cotton, wax, timber, dye-woods, mats, resins, sandalwood, camphor, etc.; the imports, earthenware, iron, steel, and copper work, piece-goods, yarns, woolen and silk fabrics, medicines, provisions, wines, spirits, rice, sugar, tea, tobacco, opium, trepang, gambir, gunpowder, etc.

Divisions.—Borneo has never formed a political unity, and there is no native designation for the island as a whole. The name Borneo (Burnei or Brunei) in fact properly applies only to the Malay kingdom on the north-west coast; and Kalamantan or Kalamantin, sometimes quoted as a general appellation, is also of limited purport. Borneo originally included nearly the whole of the northwest of the island. The sultan has absolute authority. In 1847 he undertook not to surrender any of his territory to any other power without the sanction of the British government. The capital, Brunei, 20 miles from the coast, on the river of the same name, has at the most 20,000 inhabitants; whereas it was credited by Pigafetta (16th century) with 25,000 houses. The total population of the country within its present limits may be stated at 125,000. Its area was reduced by the erection of Sarawak into a practically independent principality by Sir James Brooke (1841–68), and by the establishment of the British North Borneo Company as a recognized governing body. The company's charter, granted in 1881, transferred to them rights originally obtained by an American in 1865. This territory consists partly of a portion of the old kingdom of Brunei, partly also of districts on the east coast, claimed by the sultan of the Sulu Islands. Against the British occupation of the Sulu territory a protest was made by Spain, which had for some time been gradually incorporating the sultan's possessions. As a matter of fact the British North Borneo Company has been successful in appropriating and developing its territory, which, with an area of 30,709 square miles, and a coast line of 900 miles, is now divided into the East Coast Residency and the provinces of Dent, Keppel, and Alcock, and has its capital at Elopura or Sandakan, the largest settlement, with 5,000 inhabitants. The population of the territory is estimated at 200,000. By far the largest part of the island is ruled directly

or indirectly by the Dutch, who have divided it into the residency of the western division of Borneo, and that of the southern and eastern, the former having Pontianak as the seat of government, the latter Banjarmassin. Besides a number of smaller dependencies, the western division contains the kingdom of Landak, Tayan, Mampawa, Sukadana, Simpang, Matan, Sekadow, Sintang, Sambas. Among the separate states which go to form the southern and eastern divisions are Kotaringin, Banjarmassin, and Martapura. In consequence of a decree of the Sultan of Banjarmassin, the district watered by the Great Dyak or Kahayan is preserved for the native tribes, who in 1879 were estimated at 18,000 souls; Chinese, Malays, etc., are forbidden to ascend the river higher than the Kanpore Pilany. The same is the case with the basins of the Kapuas, Murug, known as the Little Dyak district. The population of the whole of the Dutch portion of the island on 31 Dec. 1881, was 959,491, of whom 799 were Europeans, 31,550 Chinese, 924,731 natives, 2,070 Arabs, and 341 miscellaneous Orientals. In the number of natives are included from 200,000 to 300,000 Malays settled along the coast, who used, formerly, to be counted among the strangers. The island of Labuan, off the coast of Brunei, has belonged to the British since 1846.

The Chinese had commercial dealings with Borneo as early as the 5th century, but they made no settlement for a long time after. The Malay kingdom of Borneo proper dates back to the 13th century. Another Malay settlement of later origin, Sambas, was at first dependent on Johore in the Malay peninsula. Sukadana was founded by Hindu Javanese from the kingdom of Majapahit (see JAVA) and spread its influence on the whole southern part of the west coast. Mampawa was a Buginese settlement, and Pontianak was founded as late as 1771 by a colony of Arabs, Malays, and Buginese. Islam began to be preached by Arabs from Palembang in the 16th century.

The Portuguese effected a settlement in 1690 at Banjarmassin; from thence they were, however, soon expelled. The Dutch succeeded in concluding a treaty of commerce with the princes of Banjarmassin. They erected a fort and factory in 1643, and a second in 1778 at Pontianak. The British made unsuccessful attempts in 1702 and 1774 to effect a settlement in Borneo, but, during the 19th century they acquired a preponderating influence on the north-west coast.

Bor'neol, or **Borneo Camphor**, a crystalline organic compound, often used as a substitute for common or laurel camphor. Borneol is obtained from a tree indigenous to Sumatra, Borneo, and Labuan, being deposited in crystals in cracks in the wood. To obtain it the tree is cut down, and the longitudinal fissures are opened, and the camphor removed. Large trees often yield only from 3 to 11 pounds; and owing to the reckless manner in which the trees have been destroyed without the planting of others, the Sumatran forests now contain few that are worth working. Borneol has the chemical formula $C_{10}H_{17}.OH$, and it may be prepared from common camphor by the action of reducing agents. It is not so volatile as common camphor, and is also harder. It is but slightly soluble in water, although it dissolves freely in alcohol and ether. When distilled with phos-

phorous pentoxide, borneol is converted into one or more terpenes, prominent among which is borneo-camphene or borneène ($C_{10}H_{18}$). Pure borneol sinks in water, while common camphor floats.

Bornholm, a Danish island in the Baltic Sea, nearly surrounded with rocks; situated in lat. $55^{\circ} 10'$ N.; lon. 15° E.; about 24 miles long, and 16 broad; pop. 35,364. It is stony but fertile; yields oats and butter; has excellent pastures; and also mines of coal, marble quarries, and fisheries. The island has long been famous for its rock-crystals.

Bornier, Henri, òn-rê bôr-nê-â (VICOMTE DE, vê-kônt de), French dramatist: b. Lunel, 25 Dec. 1825. His plays are notable for splendor of diction. Among them are 'Luther's Wedding' (1845); 'Dante and Beatrice'; 'The Daughter of Roland.' He twice won the prize of the Academy, with the lyrics, 'The Isthmus of Suez' (1861); and 'France in the Extreme East' (1863). He is the author of several successful novels and romances, and is a member of the Academy.

Bornite, a native sulphide of copper and iron, containing these metals in various proportions. The mineral crystallizes in the isometric system, and its crystals have the formula $3Cu_2S.Fe_2S_3$. It is red or brown in color when freshly broken, but speedily takes an iridescent tarnish. Its hardness is 3, and its specific gravity from 4.9 to 5.4. The massive varieties contain from 50 to 70 per cent of copper, and the mineral constitutes a valuable ore of that metal. Bornite occurs abundantly in a copper-mine at Bristol, Conn. It also occurs near Wilkesbarre, Pa., and it is common in the vicinity of Quebec, and at Howe Inlet, British Columbia. It is named for Dr. Ignatius von Born, a distinguished Austrian mineralogist.

Bornou', a kingdom of Central Africa, lying between lat. 10° and 15° N., and lon. 12° and $16^{\circ} 30'$ E.; bounded north by Kanem and the desert, east by Lake Chad, south by Mandara, and west by Sudan. From March to July the heat is extreme, the thermometer rising to 107° and rarely falling below 86° F.; during this time scorching winds from the south prevail. As in other tropical countries the seasons are divided into the dry and rainy: the latter continues from March to October, when the air becomes milder and fresher. The country is populous, containing 13 principal towns. These are generally large and well built, with walls 40 feet high, and about 20 feet thick. The houses consist of several courtyards, with apartments for slaves, habitations for the different wives, and several turrets connected by terraces, forming the apartments of the owner. The Bornou people, or Kanuri, have negro features; they are peaceable and industrious, practising agriculture and various mechanical arts. The government is an absolute monarchy, with certain constitutional forms, and the sultan or mai can, it is said, muster a well-equipped army of 25,000 or 30,000 men, partly cavalry, armed with musket, rifle, sabre, etc. Indian corn, cotton, and indigo are the most valuable productions of the soil. Fruits and vegetables are also raised. The domestic animals are asses, camels, horses, dogs, sheep, goats, and oxen. Lions, leopards, hyenas, jackals, elephants, and buffaloes roam

the forests. The crocodile and hippopotamus are considered a luxury. The ostrich, pelican, crane, and guinea-fowl abound. Locusts often appear in great clouds, and are eaten by the natives. The capital is Kuka, near the shore of Lake Chad. Bornou belongs to the British sphere of influence. Estimated pop. 5,000,000.

Boro Budor, bô-rô boo-dôr (the "Great Buddha"), the ruin of a temple in Java, near the junction of the Ello and Progo, the most elaborate monument of the Buddhist style of architecture anywhere existing. Javanese chronicles ascribe the building of the temple to the beginning of the 7th century; there are no inscriptions, but it was probably finished between 1400 and 1430. Boro Budor is built on a low hill between four vast volcanoes which supplied the blocks of trachyte of which the edifice is built; its height to the cupola is 118 feet. It is a pyramid of a square form, each side at the base measuring 520 feet, and consists of seven walls, which are built like the steps of a stair, up a hill. Between the walls are narrow terraces running round the building; in each is an arched doorway leading to the next higher terrace. These walls are richly ornamented with statuary. Outside are over 400 niches topped with fantastic domes, and each occupied by a large statue of Buddha. Between each of these are bas-reliefs, including figures of the god seated, and architectural ornaments and carvings of all sorts. Below the niches, on the lower story, is an immense bas-relief running round the whole building, representing scenes from the life of Buddha, and religious subjects. The inner faces of the building are also profusely ornamented with bas-reliefs, representing battles, sea-fights, processions, and chariot races, carried to an extent unrivaled by any other building in the world. Of the large reliefs alone there are over 2,000; and most of them are as vigorously designed as they are carefully executed. Within the upper square terrace are three circular ones, the outer ornamented with 32, the next with 24, and the upper with 16 small bell-shaped shrines (*dagops*), each containing a seated statue of Buddha, which can be seen through the open works of their roofs. The whole is surmounted by a cupola, the principal and probably the most ancient part of the structure. It is now empty, a sunken chamber, 10 feet deep, representing what was, no doubt, a *dagop* intended to contain the precious relic for which this splendid temple was erected. The niches containing the cross-legged figures have been supposed to be a copy, in durable architecture, of the cells of a Buddhist monastery, each occupied by a shaven priest; the cupola is rather to be classified with the topes or stupas of Afghanistan. The structure is thus a compound of a tope with a copy, in durable architecture, of the frail cells of a viharā.

Borodin, bô-rô'dên, **Alexander Porfirievich**, pôr-fêr-yâ'vich, Russian composer: b. St. Petersburg, 12 Nov. 1834; d. there, 27 Feb. 1887. He studied medicine and chemistry, and was made professor of chemistry at the Medico-Surgical Academy of St. Petersburg. He was at the same time an excellent musician, one of the chief representatives of the new Russian school. His chief works are two symphonies and 'In Central Asia.' His opera, 'Prince Igor,' which he had not completed at his death

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was finished by Rimsky-Korsakoff and Glazounoff, and was brought out in St. Petersburg in November 1890.

Borodino, bō-rō-dē'nō, Russia, a village 70 miles west of Moscow; on the Kaluga, an affluent of the Moskwa. It gave name to the great battle fought between the French army under Napoleon and the Russians under Kutusoff, 7 Sept. 1812. The battle of Borodino was one of the most obstinately disputed in history, and the loss on both sides was almost equally great. Out of 257,000 men engaged, between 70,000 and 80,000 were killed and wounded. The Russians retreated on the following day, but in the most perfect order, and therefore claim this battle as a victory; but the French, who name the battle from the Moskwa, have always maintained a similar claim.

Boroglyceride, -glis' (from "boron" and "glycerine"), an antiseptic substance, soluble in alcohol and in 40 parts of water, and containing about 25 per cent of borate of glycerine ($C_3H_5BO_3$), the remaining 75 per cent consisting of free boracic acid and glycerine in equivalent proportions. Boroglyceride is considered harmless, and is much used in the preservation of fruits and wines, and other articles of food.

Bor'on (from "borax"), one of the non-metallic elements. In nature it is never found in the uncombined or elementary state, though it occurs abundantly in combination with other elements, especially in regions that are or have been volcanic. The principal compounds of it that are found in nature are borax and boracic acid (qq.v.). It is a constituent of numerous other minerals, but most of these have but little commercial importance. Boron was first obtained in the elementary state about the year 1808, by Gay-Lussac and Thénard in France, and by Sir Humphry Davy in England. Gay-Lussac and Thénard prepared the element by heating boracic acid very strongly until all its water was expelled, and then heating the resulting substance (now known as boric oxid) with metallic potassium. The potassium removed the oxygen from the boric oxid, setting the element boron free. When thus prepared boron is an opaque amorphous powder of a greenish-brown color. It has neither taste nor odor, but it stains the fingers strongly. Owing to its finely divided condition it is apt to take fire spontaneously; but if it is consolidated by pressure it is not affected by the air at common temperatures, though it burns with a reddish light when heated. It is not affected by water save that water will dissolve a slight amount of it when it is freshly prepared. Strong nitric acid will dissolve it in the cold, and hot sulphuric acid attacks it also. It is one of the few substances that will combine directly with nitrogen, which it does when heated in that gas. The atomic weight of boron has not been determined with satisfactory precision, but Clarke gives 10.97 as the best result obtainable from the existing data. The amorphous boron described above is soluble in melted aluminum, from which it crystallizes out on cooling. The crystals so obtained were formerly thought to consist of pure boron, but it has been shown that they always contain a definite amount of aluminum. These crystals may be obtained of such hardness that they will scratch both corundum and the

ruby, the diamond being the only substance that exceeds them in this respect. The specific gravity of amorphous boron has not been satisfactorily determined, but it appears to exceed 1.84. The specific gravity of the crystals obtained as described above is said by Miller to be 2.68. The specific heat of boron varies considerably with the temperature. At 250° C. it is .37, and at 1,000° C. it is probably 0.5. Boron is a non-conductor of electricity.

Bororós, bō-rō-rōs', a tribe of South American Indians of the Tupi or Guarani stock, variously reported from a few hundred to a few thousand, living in southwestern Brazil around the headwaters of the Parana and Paraguay, the small remnants of a once powerful race, thinned by old Portuguese slave raids and disease. They live in villages and do some planting, but live mainly by hunting with long bows and bone-tipped arrows. They are exceptionally tall, averaging over five feet eight inches, and athletic, and are reported to practice both polygamy and polyandry, but little is really known of them.

Borough, in England, either an incorporated municipality with an organized government and a charter of special privileges (municipal borough), or a district represented by a member of Parliament (parliamentary borough). The *burh* (hill) was originally a hill-fort; then the settlement around it, with its own court, and head officer called a "port-reeve." Under the Norman dynasty the port-reeves were replaced by royal officers, and the boroughs gradually received special charters and were governed by their leading guilds. As their support came to be needed by the governing factions they were given representation in Parliament; and under the Tudors, especially Mary, small boroughs in great profusion were created expressly to return members in the government interest. This was stopped under Elizabeth. Besides these the older boroughs decayed till they had little or no population, but were allowed to keep their parliamentary power to strengthen the aristocratic and land-owning interest, the proprietors of the sites returning whom they chose: these were called "rotten boroughs," and the chief was "Old Sarum" (that is, Old Salisbury), with not a single inhabitant but two members of Parliament. Others had only one. Those somewhat larger, but still so small as to be at the dictation of some one person or family, were called "pocket boroughs." The Reform Bill of 1832 swept away the worst of these anomalies.

In the United States the term is now restricted to certain incorporated villages below the rank of cities in four States — Connecticut, New Jersey, Minnesota, and Pennsylvania; and is practically synonymous with "town" in most other States, and with "village" in Ohio. At the beginning of colonization the natural idea was to transplant the English borough system to America; but the conditions of settlement and government made it generally inapplicable. In Virginia the term was applied in the sense of "parliamentary borough," to districts made up of hundreds and plantations, having representation in the House of Burgesses, of which in 1619 there were 11; but the municipal borough did not take root there. Lord Baltimore and William Penn were empowered to establish the latter in

their colonies of Maryland and Pennsylvania; but the former did not avail himself of it at all, and the latter very little, nor his heirs after him. After the Revolution, however, the Pennsylvania legislature granted special borough charters freely, and in 1834 passed an act empowering courts of quarter sessions to grant them; in 1851 a general act for their creation and regulation was passed. In New Jersey they were created by special charters as early as the beginning of the 18th century, and in 1818 a general act was passed. In Connecticut they have always been created by the legislature, in special acts. In Minnesota and Pennsylvania the boundaries of the borough are coterminous with the township, forming one of the primary county divisions; in Connecticut and New Jersey the borough is only a village government within a town, which in all cases is a separate body including the borough; the latter being only the thickly settled portion within the range generally of the postal, fire, etc., departments, and governed by a warden and burgesses, corresponding to the mayor and single-chamber council of a city.

A still further extension was given to the term by the New York legislature in 1897, when the city of Greater New York was constituted of five "boroughs"—Manhattan, Brooklyn, Queens, The Bronx, and Richmond.

Borough-English, in law, a mode of descent in some ancient boroughs and manors, in which the owner's youngest son, or his youngest brother (if he has no issue), is the heir. It is evidently a custom of Saxon origin, and is so named to distinguish it from the Norman customs. It still holds in a few places.

Borromean (bō-rō-mā'an) **Islands**, four small islands in a bay of Lago Maggiore, north Italy, belonging to the Borromeo family, and named respectively Isola Bella, Isola Madre, Isola dei Pescatori, and L'Isolino. The Isola Madre lies farthest from the shore of the lake. It is laid out in seven terraces, rising one above the other, with charming walks and a mansion on the top. The Isola Bella contains a handsome and extensive palace, with private chapel and picture gallery, the fine gardens adjoining being laid out upon 10 terraces rising above each other. The island was formerly little more than a barren rock and much soil required to be brought from the mainland. The Isola dei Pescatori is mostly occupied by a fishing village. Magnificent views of the surrounding scenery are obtained from these islands.

Borromeo, bō-rō-mā'ō, **Carlo** (COUNT), saint and cardinal of the Roman Catholic Church: b. Arona, Italy, 2 Oct. 1538; d. 3 Nov. 1584. He studied law at Pavia; was in 1559 made doctor, and in 1560 was successively appointed by his uncle Pius IV. apostolical prothonotary, referendary, cardinal, and archbishop of Milan. As legate over Romagna, the March of Ancona, and Bologna, he had a great share in the civil government: as protector of Portugal, of the Netherlands, of Switzerland, of the Franciscans, Carmelites, and of the Knights of Malta, he administered several important branches of the spiritual government of the Pope, who created him his grand penitentiary, and did nothing of importance without his advice. The re-opening and the results of the Council of Trent, so advantageous to the papal authority, were chiefly

effected by the great influence of Borromeo. He did much for the embellishment of the papal buildings, employing even his own fortune for that purpose, and established many excellent institutions as archbishop of Milan; improved the discipline of the clergy, founded schools, seminaries, an order of secular priests (oblates), libraries, and hospitals, and was indefatigable in doing good. During the pestilence which raged in Milan in 1576 he distinguished himself by his heroic devotion to his flock. As soon as the scourge appeared in the city he hastened from a distant part of his diocese, where he was making a pastoral visitation, and spent all his energies in giving bodily aid and spiritual consolation to the plague-stricken inhabitants. All his virtues, however, could not save him from persecution and calumny: he was even severely attacked by the government, but no charge could be proved against him. Miracles were said to have been wrought at his tomb immediately after his death, and his canonization took place in 1610.

Borromeo, Federigo, fā-dā-rē'gō (COUNT), cardinal, and archbishop of Milan, nephew of St. Charles: b. Milan, 1564; d. 22 Sept. 1631. He founded the Ambrosian Library at Milan in 1609, and devoted to it most of his fortune. He sent emissaries to several countries to collect manuscripts for it. He added to it a printing establishment, and founded academies, schools, and charitable institutions. When Milan was desolated by a pestilence in 1630, Federigo showed the same heroism as his uncle Carlo had done during that of 1576.

Borromini, Francesco, frān-chēs-kō bō-rō-mē'nē, Italian architect: b. Bissone, 1599; d. (by his own hand) 1667. He studied sculpture in Milan and architecture in Rome under Maderno, architect of St. Peters. After Maderno's death he was a pupil of Bernini, by whom he was employed on various parts of St. Peters. He built the church of San Ivo alla Sapienza, the Oratory and Cloister of San Filippo Neri, the façade of the church of Santa Agnese in the Piazza Navona, and the interior of San Giovanni in Laterano. He was one of the chief representatives of the baroque style. Borromini conceived an unreasoning hatred for his instructor Bernini and determined to surpass him in his art, but maddened by the latter's success he committed suicide.

Borrow, George, English traveler, linguist, and writer on gypsy life: b. East Dereham, Norfolk, 1803; d. Oulton Broad, Suffolk, August 1881. On his father's side he was descended from a Cornish family, and his mother was of French extraction. His father was a recruiting officer who constantly changed his residence, and thus Borrow's early years were passed in various parts of the United Kingdom. He received part of his education in Edinburgh High School, and in 1820 was articled to a Norwich solicitor. It was about this time that he laid the foundation of his linguistic knowledge under the guidance of William Taylor, a friend of Southey. After his father's death he went to London, where he earned his livelihood by literary hackwork; but, soon tiring of this, he set out on a series of journeys through England, France, Germany, Russia, and other countries, acting latterly as agent of the British and Foreign Bible Society and making gypsy life and

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customs a special study. During the seven years or so prior to his engagement by the Bible Society he seems to have suffered great privations, but of his movements at that time he has told us nothing. He married in 1840, and settled on a small estate of his wife's at Oulton Broad, in the northeast of Suffolk, where he died. He maintained to the last his strong sympathy for gypsy life, and not only permitted but encouraged the gypsies to encamp on his estate. His best known work is 'The Bible in Spain' (3 vols. 1843); and his other publications include 'Targum: or, Metrical Translations from Thirty Languages and Dialects' (1835) 'The Zincali: or, an Account of the Gypsies in Spain' (1841); 'Lavengro, the Scholar, the Gypsy, the Priest' (1851), a sort of idealized autobiography; 'The Roman Rye,' a sequel to 'Lavengro' (1857); 'Wild Wales, Its People, Language, and Scenery' (1862); and 'Romano Lavo-Lil' (1874), a dictionary of the gypsy language. Borrow was a strong, manly character, delighting in the free, open-air existence of the gypsies whose life he knew so well, and despising heartily all affectation and false gentility. His later works, by their outspokenness, lost him much of the reputation earned by his 'Bible in Spain.' See the 'Life Writings, and Correspondence' by Dr. Knapp (2 vols. 1899).

Borrowing Days, the last three days of March, Old Style; the popular notion being, in Scotland and some parts of England, that they were borrowed by March from April. The fiction is of great antiquity, and probably arose in the observation of a frequent wintry relapse about the end of March.

Borrowstounness (popularly pronounced and now often written BO'NESS), a town in Linlithgowshire, Scotland, distant 17 miles west by north of Edinburgh. It is situated on a low peninsula, washed by the Forth, and possesses three principal streets running from west to east, one of them a continuation of the other two. The chief industrial establishments are potteries, iron-foundries, engineering shops, chemical manure works, saw-mills, timber-yards, coal and coke works, distilleries, brick-fields, etc., and in the vicinity are very extensive collieries. A new dock has recently been constructed and the old harbor improved, hydraulic hoists and other appliances being provided. There is a large trade in coal, iron, timber, etc., and fishing is also carried on. The wall of Antoninus ran through the parish of Borrowstounness, and traces of it, called Graham's Dyke, are still visible on the east bank of the Avon. Pop. (1901) 9,100.

Borsip'pa, a very ancient city of Babylonia, the site of which is marked by the ruins Birs Nimrud.

Bortnyanski, Dmitri Stepanovitch, dmě'trě stěp-ăn'ô-vich bort-nyân-ske, Russian composer: b. Glukhov, 1751; d. St. Petersburg, 9 Sept. 1825. He received his education at Moscow and at Venice and other Italian cities, under Galuppi. In 1779 he returned to Russia and was appointed director of the Imperial Chapel, devoting himself to the improvement and training of the choir. His compositions are almost entirely church music, including 35 sacred concertos, a liturgy for three voices, and a collection of psalms. His music, combining the

spirit of both the Slavic and the Italian, is thoroughly original and made an epoch in Russian church music.

Bory de Saint Vincent, Jean Baptiste George Marie, zhôn băp-těst zhôrzh mărě bô-rě dè săn vãn-sôn, French naturalist: b. 1780; d. 1846. About 1800-2 he visited the Canaries, Mauritius, and other African islands. He afterward served for a time in the army, and conducted scientific expeditions to Greece and to Algiers. Among his chief works are 'Annales des Sciences Physiques' (8 vols. 1819-21); 'Voyage dans les Quatre Principales Iles des Mers d'Afrique' (3 vols. 1804); 'Expédition Scientifique de Morée' (3 vols. 1832); 'L'Homme, Essai Zoologique sur le Genre Humain' (2 vols. 1836).

Borysthenes, bô-ris'thên-ēs, the ancient name of the Dnieper.

Borz'oi, or **Russian Wolfhound**, a hunting-dog of northern Europe, substantially the same as the ancient long-haired greyhound of the Arabs and Persians, whose coat has been lengthened in adaptation to a cold climate. It is a lithe, active dog, standing 28 inches high at the shoulders, and upward, and weighing from 75 to 100 pounds. Its hair is silky and loose, especially so on the tail, which, contrary to the other greyhound characteristics, is "feathered" longer than is the setter's, which it very much resembles. It has large padded feet. In color the borzois are combinations of black, white, and tan. These dogs are popular, especially as stately attendants upon ladies, and good specimens may be seen at all the principal kennel shows of the country.

Bos, Lambert, Dutch philologist: b. Worum, Friesland, 23 Nov. 1670; d. 6 Jan. 1717. He was instructed by his father in Greek and Latin. Vitringa, the distinguished Oriental scholar, was professor at Franeker, and thither young Bos went to pursue his philological studies. Not long after he was chosen Greek professor in that university. He is best known by his work entitled 'Ellipses Græcæ' (1702), though he was the author of several others, among which may be mentioned an edition of the Septuagint and 'Animadversiones ad Scriptores Græcos.'

Bosa, a seaport on the west coast of Sardinia, province of Cagliari, built partly on the side of a hill crowned by an old castle, and partly in an unhealthy plain. It has a cathedral and other churches, a theological seminary, and is the residence of a bishop, suffragan to the archbishop of Sassari. It is in a wine and oil producing region and carries on coral fishing and tanning. Pop. (1901) 6,846.

Bosanquet, bô-săn-ka, **Bernard**, English philosopher: b. 1848. He was lecturer at University College, Oxford, 1871-81, and from 1881 to 1897 was much engaged in university extension lecturing and charity organization. He has written 'Logic, or Morphology of Knowledge'; 'History of Æsthetic'; 'Knowledge and Reality'; 'Essays and Addresses'; 'Civilization of Christendom'; 'Essentials of Logic'; 'Aspects of the Social Problem'; 'Psychology of Moral Self'; 'Companion to Plato's Republic, for English Readers'; 'Education of the Young in Plato's Republic'; 'Philosophical Theory of the State.'

Bosc, Louis Augustin Guillaume, French naturalist: b. Paris, 29 Jan. 1759; d. there, 10 July 1828. Employed in various public offices until 1793, his political sympathies made him obnoxious to the terrorists, and concealing himself in the forest of Montmorency, he resumed there, under the greatest difficulties, his favorite science of botany, having already previously gained some distinction as a naturalist. On returning to Paris after the fall of Robespierre he was sent in 1796 as French consul to the United States; but, not recognized in this position by the American authorities, he explored the country for scientific purposes. In 1799 he was appointed chief of the administration of prisons, but lost this office on the 18th Brumaire. Applying himself thenceforward to literary labors, he made numerous contributions to natural science. His 'Histoire Naturelle des Coquilles' (5 vols. 2d ed. Paris 1824) and 'Histoire des Vers et des Crustacées' (2 vols. 2d ed. Paris 1829), and his studies on the vines of France, are his principal achievements. He was made a member of the Academy of Sciences, of the Central Agricultural Society, and finally, after having been inspector of the gardens at Versailles, he became professor at the Jardin des Plantes at Paris. Roland, under whose administration he had served, and who perished with his wife on the guillotine, made him guardian of their daughter. Bosc published memoirs of the celebrated Madame Roland, and succeeded in obtaining for Mlle. Roland the confiscated property of her unfortunate parents.

Boscan Almogaver, Juan, Spanish poet: b. Barcelona, about 1493; d. near Perpignan, April 1542. His parents, who belonged to the most ancient nobility, gave him a careful education. He followed the court of Charles V. and in 1526 was attached to it for some time in Granada. His noble manners and character gained him the favor of the emperor, and the education of the Duke of Alba was committed to him. After his marriage Boscan lived at Barcelona, occupied in publishing his works, together with those of his deceased friend Garcilaso, in which task he was employed at the time of his death. Boscan first introduced Italian measures into Spanish, and thus became the creator of the Spanish sonnet. He published his poetical works in 1543. His poems are still esteemed, the best edition being that published at Madrid in 1875. Among his works are 'Leandro y Hero' and 'La Alegoria.'

Boscawen, Edward, British admiral: b. Cornwall, England, 19 Aug. 1711; d. near Guildford, Surrey, 10 Jan. 1761. He was a son of Viscount Falmouth. Having entered the navy he distinguished himself at Porto Bello (1740) and Cartagena (1741), where he stormed a battery at the head of a part of his crew. In 1744 he was promoted to the Dreadnought, a 60-gun ship, in which he took the French frigate Medea. Three years afterward he signalized himself under Anson, at the battle of Cape Finisterre. Toward the close of this year he was appointed commander-in-chief by sea and land in the East Indies, and was despatched thither with a squadron. He failed in attempts on Mauritius and Pondicherry, and in 1750 returned to England, where he obtained a seat at the admiralty board. In 1755 he became vice-admiral and sailed for North America, and in

an action with a French squadron two ships of the line fell into his hands. It was he who signed the immediate order for the execution of Byng in 1757. In 1758 he was promoted to the rank of admiral of the blue, and in conjunction with Lord Amherst, who commanded the land forces, he was present at the capitulation of Louisburg. The year following, having then the command in the Mediterranean, he pursued the Toulon fleet, under De la Clue, through the Straits of Gibraltar, and coming up with it in Lagos Bay, completely defeated it, burning two ships and taking three. For these services he received the thanks of Parliament and \$15,000 a year, with the rank of general of marines, in 1760.

Bosch, Balthazar van den, Dutch painter: b. Antwerp, 1681; d. 1715. The first work which brought him into notice was an equestrian picture of the Duke of Marlborough, executed in concert with Van Bloemen, who painted the horse. He was afterward employed on a number of works, for which he is said to have received as high prices as Teniers or Ostade; and a short time before his death was appointed director of the Academy of Antwerp.

Bosch, Ernst, German painter: b. Crefeld, 1834. He studied under Schex at Wesel and at the academy in Düsseldorf. His works show a pleasing combination of figure, animal, and landscape painting; many of his pictures excel in humor. Among his best paintings are 'The Smuggler'; 'Defense of a Block-house against Indians'; 'Gipsy Gang in the Village'; 'The Rogues' School'; 'Hermann and Dorothea at the Spring.'

Bosch, Hieronymus, Dutch painter and engraver: b. Bois le Duc, Netherlands, about 1462; d. there 1516. His fancy partook of the grotesque, Gothic character of the Middle Ages, and his pictures are ingenious representations of devils, spectres, and the torments of the lost. Some of his works, however, representing scriptural scenes, possess greater dignity. His engravings resemble his paintings, and have become very scarce.

Boschbok, the Dutch form of the English name "bush-buck," given to several South African antelopes, specifically the *Tragelaphus sylvaticus*. It is prized for its venison.

Boschvark, the bush-hog or bush-pig of South Africa (*Charopotamus* or *Potamocharus africanus*), one of the swine family, about five feet long, and with very large and strong tusks. The Kaffirs esteem its flesh as a luxury, and its tusks, arranged on a piece of string and tied round the neck, are considered great ornaments.

Boscobel, England, a parish in Shropshire, unimportant in itself, but remarkable historically as the hiding place of Charles II. for some days after the battle of Worcester, 3 Sept. 1651. Boscobel House belonged at the time to a staunch royalist, and as it was judged a convenient place of retreat, Charles at once proceeded in that direction, and hid himself during the day in the thickest part of the wood. After making one attempt to escape from England through Wales, he was compelled to return again to his former hiding-place, and concealed himself among the branches of a pollard oak in Boscobel Wood, where it is related that he could actually

see the men who were in pursuit of him, and hear their voices. The "royal oak" which now stands at Boscobel, is said to have grown from an acorn of this very tree. An account of Charles' adventures after the battle of Worcester was published in 1662, with the title, 'Boscobel, or the Compleat History of his Sacred Majesty's most Miraculous Preservation after the Battle of Worcester.' This history is said to have been the work of Thomas Blount.

Boscovich, Roger Joseph, Italian astronomer and physicist: b. Ragusa, Dalmatia, 18 May 1711; d. Milan, 12 Feb. 1787. He was educated among the Jesuits, and entering into their order, was appointed professor of mathematics in the Roman College, before he had entirely completed the course of his studies. He was employed by Pope Benedict XIV. in various undertakings, and in 1750 began the measurement of a degree of the meridian in the Ecclesiastical States, which operation occupied him for two years. He afterward visited the Pontine Marshes, to give advice respecting the draining of them. He was then intrusted by the Republic of Lucca with the defense of its interests, in a dispute about boundaries with the government of Tuscany. This affair obliged him to go to Vienna, and having terminated it with success, he visited Paris and London. He was elected a Fellow of the Royal Society, and dedicated to this body a Latin poem on eclipses. Returning to Italy, he was appointed mathematical professor in the University of Pavia; whence, in 1770, he removed to Milan, and there erected the celebrated observatory at the College of Brera. On the suppression of the order of Jesuits, he accepted an invitation to France from Louis XV., who gave him a pension of 8,000 livres, with the office of director of optics for the navy. This appointment induced him to pay particular attention to that part of optical science which treats of the theory of achromatic telescopes, on which subject he wrote a treatise of considerable extent. He was obliged to leave Paris in 1783, on account of ill health, when he retired to Milan. He was one of the first among continental philosophers to adopt the Newtonian theories. An edition of the works of Father Boscovich was published by himself at Bassano, in 5 volumes, 4to, 1785. His 'Theoria Philosophiæ Naturalis reducta ad Unicam Legem Virium in Natura Existentium,' first published in 1758, is a curious production containing speculations of which Dr. Priestley availed himself in his writings in favor of materialism. He wrote also 'De Maculis Solaribus.'

Bosio, Angiolina, Italian opera singer: b. Turin, 22 Aug. 1829; d. St. Petersburg, 12 April 1859. At an early age she showed so decided a taste for music, that her parents were induced to place her under the instruction of Cattaneo, at Milan. The best evidence of her progress and talent for singing, was her début in her 15th year at Milan, in Verdi's 'Due Foscari,' with decided success. Thenceforth a series of triumphs awaited her.

Bosio, François Joseph (BARON), French sculptor: b. Monaco, 19 March 1769; d. Paris, 29 July 1845. He was much employed by Napoleon I., for whom he executed busts of Josephine and Hortense, and by the successive Bourbon and Orleans dynasties. His works are well known in France and Italy.

Bosna-Seraï, or Serajevo (ancient TIBERIOPLIS), formerly capital of the province of Bosnia, now of the Austro-Hungarian district of Serajevo, situated on the Miliatzka, which is here crossed by a handsome stone bridge, 122 miles southwest of Belgrade, and 570 miles west-northwest of Constantinople. The town was founded about 1263. It is well built, and although most of the houses are of wood, has a gay and pleasant appearance from the number of towers and minarets with which it is embellished. Many improvements have been introduced since the Austrian occupation. It contains a *serai* or palace, built by Mohammed II., to which the city owes its name; many mosques, great and small; churches, monasteries, two large bazaars, schools, baths, and charitable institutions. It was formerly surrounded with walls, but these are now completely decayed; and its only remaining defense is a citadel, built on a rocky height at a short distance east from the town, mounted with cannon. Serajevo is the chief mart in the province, the centre of commercial relations between Turkey, Austria, and South Germany; and has, in consequence, a considerable trade. It has manufactures of arms and utensils of copper; ironware, woolen and worsted stuffs, morocco leather, cottons, etc. There are also several tanneries in the city, and at a short distance from it several important iron mines; and on a plain which stretches to the west the baths of Serajevsko. Pop. 26,286.

Bosnia (properly BOSNA), the extreme northwestern province or eyalet of European Turkey, comprising Bosnia proper, Herzegovina, and parts of Turkish Croatia and Dalmatia, bounded north by the river Save, west by Dalmatia and the Adriatic, east by Servia, and south by Albania and Montenegro. By the terms of the Treaty of Berlin (1878), it was occupied by Austrian troops, to be administered for an undefined future period by the Austrian government. It comprehends, besides the ancient Bosnia, part of Croatia, a tract of Dalmatia, and Herzegovina, and contains from 23,000 to 24,000 square miles (of which Bosnia proper occupies 16,200). The inhabitants are mostly of Slavonian origin, and comprise Bosniaks, Servians, Morlaks, and Croats, besides Turks, Greeks, Jews, Gypsies, etc. The Bosniaks are the most numerous. They are partly Mohammedans, partly Roman and Greek Catholics. The Servians and Croats are next in point of number. The country is level toward the north; in the south mountainous and woody. Its chief rivers are the Save, the Verbas, the Bosna, Rama, and Drina. Bosnia contains fertile fields, orchards, and vineyards; the breed of cattle is excellent, and the mountains furnish good iron, of which a great part is manufactured in the country into guns and blades. The other articles manufactured are leather, morocco, and coarse woolen cloths. In the 12th and 13th centuries Bosnia belonged to Hungary. In 1339 it fell into the hands of Stephen, king of Servia. After his death it remained independent, and the Ban Twartko took the title of king in 1370. In 1401 it became tributary to the Turks, and since 1463 has been a Turkish province. It is divided into the southern and northern parts, or Upper and Lower Bosnia. The former is commonly called Herzegovina (q.v.). The capital of Bosnia is

BOSPORUS — BOSSE

Bosna-Serai (q.v.); **Zvornik**, **Banyaluka**, **Mostar**, and **Travnik** are also important places. The Bosniaks are boorish in their manners and uncourteous toward strangers, but industrious and temperate. The women, like the men, are well and strongly made, and mostly good-looking. The Bosniaks are fond of hunting and fishing, and engage to some extent in agriculture and cattle-raising. Servian is the language generally spoken. Bosnia has often attempted to throw off the Turkish yoke, and after the Russo-Turkish war of 1877-8, which was led up to by an insurrection in Herzegovina and Bosnia, the provinces were with the consent of the great powers occupied by Austria. Pop. including Herzegovina (1895) 1,591,036.

Bosporus, or **Bosphorus** (that is, "Oxford"), the strait, 18 miles long, joining the Black Sea with the Sea of Marmora, called also the Strait of Constantinople. It is defended by a series of strong forts, and by agreement of the European powers no ship of war belonging to any nation shall pass the strait without the permission of Turkey. The shores of the Bosporus are elevated and the scenery picturesque. Over this channel (about 3,033 feet wide) Darius constructed a bridge of boats, on his expedition against the Scythians. The Cimmerian Bosporus was the name given by the ancients to the strait that leads from the Black Sea into the Sea of Azov, now the strait of Kaffa or Yenikale, the other Bosporus being distinguished as the Thracian Bosporus. There was anciently a Greek kingdom of the name of Bosporus, so called from the Cimmerian Bosporus, on both sides of which it was situated. The capital of this kingdom was Panticapæum (represented by the modern Kertch), in the Tauric Chersonese, the ancient name of the Crimea. This kingdom was founded about 480 B.C. Spartacus was among the first kings. Under a successor, Satyrus, the kingdom was extended to the coast of Asia, and his son Leucon farther extended it. He improved the commerce of the country (in particular by the exportation of corn to Athens, also of fish, fur, skins, bees'-wax, and slaves). From him his descendants were called Leuconidæ. Leucon became tributary to the Scythians 290 B.C., and the tribute was finally so oppressive that Parisades, the last of the Leuconidæ, preferred to submit to Mithridates king of Pontus, who vanquished the Scythians under Scilurus 116 B.C., and made his son king of Bosporus. At the death of Mithridates the Romans gave the country, 64 B.C., to his second son, Pharnaces, who was afterward murdered. The Romans placed different princes successively upon the throne, who all pretended to be descendants of Mithridates. When this family became extinct, 259 A.D., the Sarmatians took possession of the kingdom, from whom it was taken by the Chersonesians in 344. The Tauric Chersonese then belonged to the Eastern Empire, till it was seized by the Chazars, and afterward by the Tartars, under the Mongol princes.

Bosquet, *bos-kä*, **Pierre François**, French soldier: b. Mont de Marsen, France, 8 Nov. 1810; d. Toulouse, 5 Feb. 1861. In 1829 he entered the Polytechnic School, and, in 1833, became a sub-lieutenant in the artillery. In 1835, he went with his regiment to Algeria, where he began to distinguish himself. Be-

tween 1836 and 1848 he had passed through the successive ranks of captain, chef-de-bataillon, lieutenant-colonel, and colonel, when, in that year, he was appointed by the Republican government general of brigade. In 1854 the Emperor Napoleon III. raised him to the rank of general of division, and enrolled him in the staff of the army of Marshal St. Arnaud. He was with the French army in the Crimea, where he greatly distinguished himself, and was wounded in the assault on the Malakoff Tower at the siege of Sebastopol. In 1856, he was made a marshal of France, and a senator. In 1859, he was appointed to a command in the war against Austria.

Boss, Lewis, American astronomer: b. Providence, R. I., 26 Oct. 1846. He was graduated at Dartmouth College, in 1870; astronomer of the Northern Boundary Survey for the determination of the line between the western part of the United States and British America; and, since the completion of that work, director of the Dudley Observatory, Albany, N. Y. He was chief of the United States party sent to Chile in 1882 to observe the transit of Venus; was elected a member of the National Academy of Science, in 1889, and an honorary foreign associate of the Royal Astronomical Society, in 1890. He is best known for his work upon star declinations, undertaken in connection with his work on the boundary survey, which is the most complete investigation of the kind ever executed, and for his 'Catalogue of 8,241 Stars' — which was a part of the 'Co-operative Catalogue' prepared by leading astronomers of Europe.

Boss, a master or overseer, a term often applied to the superintendent of a gang of workmen. In American politics, the term came into use, after the exposure of the Tweed Ring, to designate the leader of a political organization who retains his power by unscrupulous methods and the use of public offices as rewards for his supporters.

Boss, in Gothic architecture the protuberance in a vaulted ceiling formed by the junction of the ends of several ribs, and serving to bind them together; usually elaborately carved and ornamented.

Bosse, *bös*, **Abraham**, French engraver and etcher; b. Tours, 1605(?); d. there, 1678. He lived most of his life in Paris and was professor in the Royal Academy of Painting there. He prepared about 800 plates representing festivals and various scenes in the life of the people. He wrote also 'Traité des Manières de Graver en Taille Douce sur l'Airain par l'Eau Forte et les Vernis Durs et Mols.'

Bosse, *bös-sè*, **Robert**, German statesman: b. Quedlinburg, 1832. He studied law at Heidelberg, Halle, and Berlin, held different offices in Prussia, and in 1876 he entered the Prussian ministry. In October 1889 he became under-secretary of state in the imperial Department of the Interior, and in this capacity had an important part in framing the laws for the insurance of workmen, and in defending them in the Reichstag. In 1891 he became secretary in the Department of Justice, and was president of the commission to frame the new Civil Code. In 1892 he again entered the Prussian ministry as minister of education. He was

editor of the 'Monatsschifte für Deutsche Beamte'; and he wrote 'Commentary on the Laws of 1889 for the Insurance of Invalids and the Aged'; 'An Official Journey to the Orient' (1900) and several articles in sociological and legal periodicals.

Bossi, Enrico Marco, ěn-rĕ'ko mār-kō bōs-sĕ, Italian composer: b. Salò, 1861. He was educated at the Milan Conservatory, was organist in the Como cathedral and instructor in organ-playing at the Naples Conservatory. His musical compositions include an organ concerto, 'Il Cieco,' an opera, and 'Canticum Cantorum,' a sacred cantata. He has written (with Tebaldini) 'Method of Study for the Modern Organ.'

Bossi, Giuseppe Carlo Aurelio, Italian politician and poet: b. Turin, 15 Nov. 1758; d. Paris, 20 Jan. 1823. When only 18 years old he made a successful debut as a dramatist. In 1792 he was sent on a diplomatic mission to Berlin, and a few months later to St. Petersburg. In 1796 King Charles Emanuel IV. appointed him his agent near Gen. Bonaparte. He acted a somewhat conspicuous part in the various changes imposed upon the Sardinian states by the directory and the consular government of France; and finally was, with Carlo Giulio and Carlo Botta, a member of the triumvirate which governed Piedmont previous to its annexation in 1802. Some two years later he entered the French civil service, and was appointed prefect of Ain. In 1810 he was made a baron of the empire, and promoted to the prefecture of Manche, which post he kept on the first restoration; but having, in March 1815, adhered to Napoleon, he was dismissed on the second return of the Bourbons. He wrote some lyrical poems, and also 'L'Indipendenza Americana,' 'La Olanda pacificata,' in two cantos, and 'Oromasia,' in 12 cantos, giving a description of the principal events in the French revolution.

Bossuet, Jacques Bénigne, Bishop of Meaux: b. Dijon, 27 Sept. 1627; d. 16 April 1704. While attending the Jesuit College at Dijon he got possession of a Latin Bible, which made an indelible impression upon him. At the age of 15 he was sent to Paris, where he entered the College of Navarre, the president of which, Nicholas Cornet, took pleasure in forming his mind. Bossuet, under the direction of this worthy teacher, studied Greek and the Holy Scriptures, read the ancient classics, and investigated the Cartesian philosophy. He was made Doctor of the Sorbonne and canon in Metz. Here he edified his hearers by his preaching and example; was commissioned by his bishop to refute the catechism of the Protestant minister Paul Ferry, and did it in such a way that even his antagonists were obliged to respect him. The queen-mother (Anne of Austria) was induced, by this work, to employ Bossuet in the conversion of the Protestants in the diocese of Metz. This business often called him to Paris, where his sermons met with great approbation. The sermon which he delivered in 1668, on the occasion of Marshal Turenne's joining the Roman Church, procured him the bishopric of Condom. In 1670 the king charged him with the education of the dauphin. In consequence of this appointment he resigned his bishopric in 1671, because he thought it inconsistent with his duty to retain it during a

continual absence from his diocese. At this time he delivered his sermon at the funeral of Madame the Duchess of Orleans—a princess who, in the midst of a brilliant court, of which she was the ornament, died suddenly in the bloom of youth. His last sermon of this kind (that at the tomb of the great Condé) is considered as a masterpiece. The manly vigor which characterized his orations is seen also in the 'Discours sur l'Histoire Universelle,' designed for the instruction of his royal pupil. The care which he took of the education of this prince was rewarded in 1680 by the office of the first almoner of the dauphin; in 1681 by the bishopric of Meaux; in 1697 he obtained the dignity of a councillor of state, and a year afterward that of the first almoner of the Duchess of Burgundy. His practice and his doctrine were equally severe. All his time was divided between his studies and the execution of his official duties; he seldom allowed himself any recreation. The learned Benedictines of the Brotherhood of St. Maur published a complete edition of the works of Bossuet in 43 volumes 8vo (Versailles 1815-19). Bossuet was unrivaled as a pulpit orator, and greatly distinguished for his strength and acumen as a controversialist. Among the most celebrated of his works are his 'Oraisons Funèbres'; 'Histoire des Variations des Eglises Protestantes'; 'Politique tirée des propres Paroles de l'Ecriture Sainte.' The French Academy consider him among their most renowned members. He has described his own life at length. For his dispute with the archbishop of Cambrai, Fénelon, see FÉNELON and QUIETISM.

Bossut, Charles, French mathematician: b. Tartaras, in the department of the Rhône, 11 Aug. 1730; d. 14 Jan. 1814. He was educated at the Jesuit College, Lyons, and having met with the 'Eloges of Fontenelle,' was smitten with so eager a desire to imitate the distinguished individuals therein described, that he wrote to Fontenelle himself on the subject. That veteran, now 90 years of age, not only answered the letter, but expressed such an interest in the future progress of his young correspondent, that Bossut repaired to Paris, and was introduced by Fontenelle to Clairaut and D'Alembert, the latter of whom he appears to have particularly admired and studied to imitate. In 1752 he was appointed professor of mathematics to the school of Mézières, and held that office for 16 years, during which he gained several prizes offered by the Academy of Sciences. He was afterward admitted a member of that body, and was at the same time appointed examiner of candidates for the artillery and engineers. At the Revolution he was deprived of all his appointments, and afterward lived in retirement till his death. His most important works are a 'Course of Mathematics,' which was long in repute as a textbook; a 'Treatise on Hydrodynamics'; the 'Introductory Discourse to Mathematics,' and various other articles in the Encyclopédie; and a 'History of Mathematics.' He also edited the works of Pascal.

Bostanji, a class of men in Turkey, numbering about 600, originally the Sultan's gardeners, but now also employed in several ways about his person, as mounting guard at the seraglio, rowing his barge, etc., and likewise in attending the officers of the royal household.

BOSTON

Boston, England, a municipal and parliamentary borough and port of Lincolnshire, situated on the river Witham, about five miles from the sea, 32 southeast from Lincoln. It derived its name (a corruption of Botolph's town) from St. Botolph, who founded a monastery here about the year 650. Its chief interest for Americans lies in the fact that it was the English home of the most influential of the settlers of Boston, Mass. The port had formerly a flourishing trade, but owing to various causes, and especially the fact that in dry seasons the river became choked up with sand brought in by the tides, this trade greatly declined. In 1881 a new channel was constructed so as to bring the town within three miles of the sea by navigable water; and a new dock of seven acres area, capable of admitting vessels of 3,500 tons at the highest tides, was opened three years later. Boston contains some fine buildings, notably the parish church of St. Botolph, the Cotton chapel, and various other places of worship, a grammar-school dating from 1554, the Athenæum, the Guildhall, and the Assembly rooms, under which are arranged the butter-market, poultry-market, and the police-station. St. Botolph's Church is a very large and handsome Gothic structure, with a tower, known as Boston Stump, 282 feet high, containing a carillon of 36 bells cast at Louvain. In the upper part of the tower, octagonal in shape, lights used to be suspended for the guidance of mariners at sea and travelers crossing the fens by night. The town is now well supplied with water brought from a reservoir distant about 14 miles. The leading industries comprise iron and brass foundries, the manufacture of farm implements, sails, ropes, and bricks, and tanning, brewing, and malting. Fishing also gives occupation to many of the inhabitants, and there is steam communication with Hamburg, Hull, and London. Pop. (1901) 15,711.

Boston, Mass., the capital of the State, and, according to the United States census of 1900, fifth city in population in the United States. It is situated on the western shore of Massachusetts Bay. The settlement from which it has grown was made in 1630 by members of the Massachusetts Bay Company, bearing with them the charter granted to this organization by Charles I. The leader of the first expedition of settlers who landed at Charlestown, 17 June 1630, was Gov. John Winthrop, a Puritan gentleman. In his fleet came others of like condition, Sir Richard Saltonstall, Isaac Johnson and his wife, the Lady Arbella, daughter of the Earl of Lincoln, together with a company of sturdy Puritans, chiefly from Lincolnshire. They landed 700 or 800 strong, a number soon increased to 1,000 and then to 2,000 by later arrivals—the most considerable settlement on the American coast. At the end of the first summer, a season of hardship, they moved across the Charles River to the promontory of Shawmut—an Indian word translated "living fountains." This headland, with ample water-supply, was called by the English settlers Trimountain, from the three-peaked hill, now Beacon Hill, which formed its highest eminence. On 17 Sept. 1630 it was voted to change its name to Boston, after the Lincolnshire town from which some of the chief settlers had come. The origi-

nal settler of the land, the Rev. William Blackstone (q.v.), a scholar who had left England to avoid the "lord-bishops," sold the newcomers his land and moved on to Rhode Island, in order to escape the "lords-brethren."

From the first the power of the Puritan clergy was important. Church and State were practically one. Trained in the English universities, the ministers set a true value upon education. A free public school was established in 1633, and in 1636 the General Court provided for the beginnings of Harvard College. The government both of town and of colony was purely democratic, having for its unit the town-meeting, which in Boston itself maintained its sway, with the single interruption of British military rule at the outbreak of the Revolution, until the town became a city in 1822. Besides the training in self-government thus acquired, Boston had the advantage of virtual independence through its early years. At first the Crown was fully occupied with its own problems in England; and when Cromwell came into power, so strongly Puritan a settlement was naturally left much to its own devices. Thus the charter of the Bay Company, and the liberties enjoyed under it, became very dear to the people of Boston. When Charles II. came to the throne there were grave fears that these liberties would be seriously curtailed. In 1664 four royal commissioners came from England to adjust difficulties in several colonies. Their mission to Boston was a failure, and for some years to come the town was secure under its original system of government.

Under James II. came the dreaded change. Complaints of the Boston spirit of independence and religious intolerance were borne more frequently to the English court, and before the death of Charles II. the Court of Chancery voted the Massachusetts Bay charter vacated. In the summer of 1686 the original government of the colony came to an end. Before the close of this year, Sir Edmund Andros, the new governor appointed by the king, the first chief magistrate in Massachusetts not chosen by popular election, arrived in Boston. Probably nobody in his peculiar place could have satisfied the people at this time. Within less than three years from his arrival a bloodless revolution in Boston, a well-organized uprising of the people, removed him from office. Early in 1690 he was sent back to England, where Increase Mather, the leading minister of Boston, had already been for nearly two years, trying to have the old charter restored, or to get the best possible substitute for it. This he succeeded in doing, after the accession of William and Mary, and had the further satisfaction of choosing the first governor under the new instrument making Massachusetts a royal province. With this governor, Sir William Phipps, Mather returned to Boston in the spring of 1692.

By this time Boston had grown to importance as the leading seaport, and in many respects the foremost town in America. Before the end of the 17th century its population was approximately 7,000. In another half century this number was more than doubled. A good idea of certain aspects of the town in this period is given by an Englishman, Daniel Neal, who wrote in 1719:

BOSTON

"The bay of Boston is spacious enough to contain in a manner the navy of England. The masts of ships here, and at proper seasons of the year, make a kind of wood of trees like that we see upon the river of Thames about Wapping and Limehouse, which may easily be imagined when we consider that by computation given into the collectors of his Majesty's customs to the governor upon the building of the light-house, it appeared that there was 24,000 ton of shipping cleared annually.

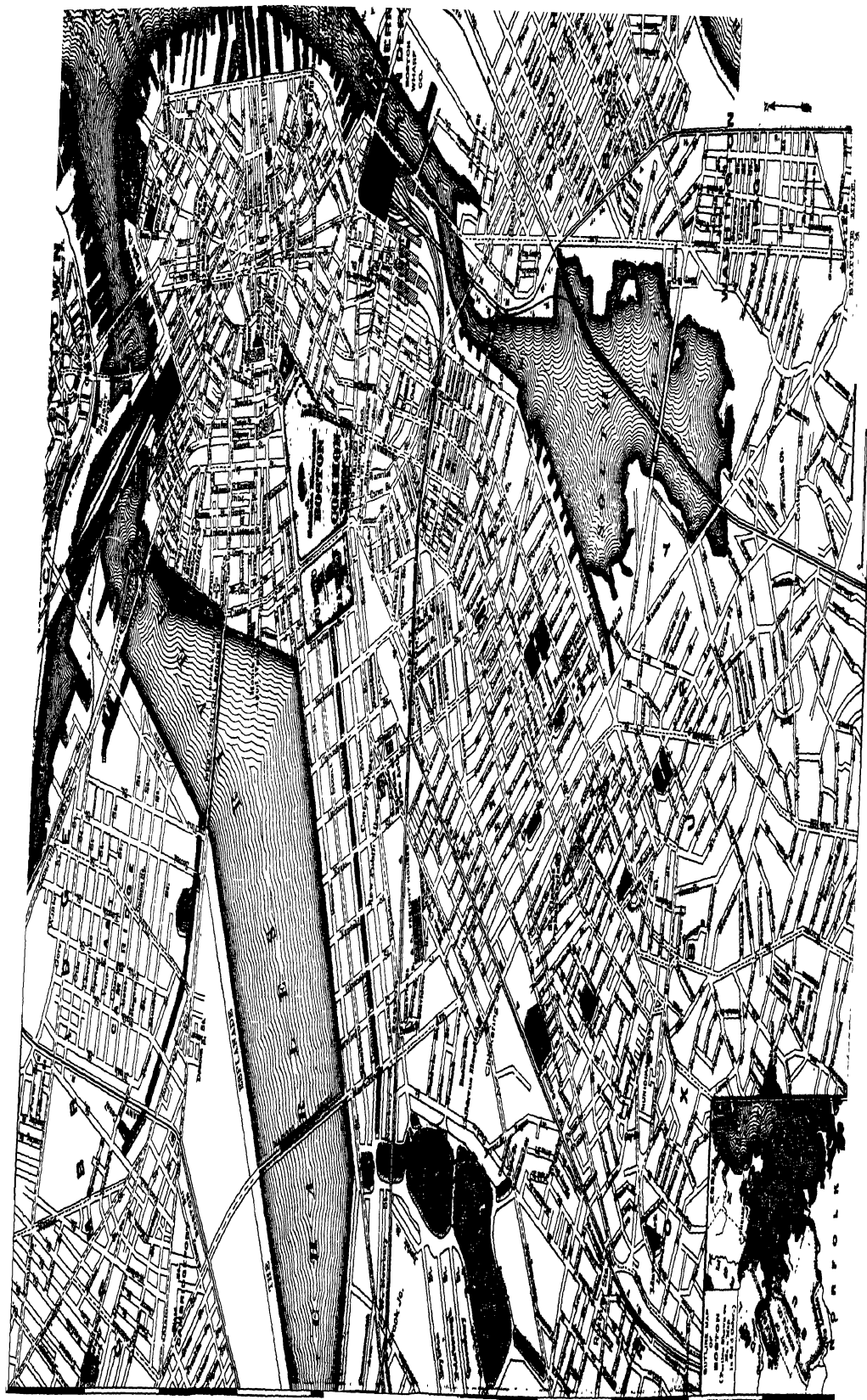
"At the bottom of the bay is a noble pier 1,800 or 2,000 foot long, with a row of warehouses on the north side for the use of merchants. The pier runs so far into the bay that ships of the greatest burthen may unlade without the help of boats or lighters. From the head of the pier you go up the chief street of the town [now State Street], at the upper end of which is the town house or Exchange, a fine piece of building, containing, besides the walk for the merchants, the Council-Chamber, the House of Commons, and another spacious room for the sessions of the courts of justice. The Exchange is surrounded by booksellers' shops, which have a good trade. There are five printing presses in Boston, which are generally full of work, by which it appears that humanity and the knowledge of letters flourish more here than in all the other English Plantations put together; for in the city of New York there is but one bookseller's shop, and in the Plantations of Virginia, Maryland, Carolina, Barbadoes, and the Islands, none at all."

As in the 17th so in the 18th century, the clergy and ecclesiastical affairs loomed large upon the local horizon. The prominence in Boston records of what is known as the "Mather dynasty"—of which Increase and his son, Cotton Mather, were the chief figures—bears witness to this condition. The younger of these Puritan priests is remembered largely for his connection with the witchcraft delusion, which had its worst effects in Salem, but in temporal matters and humanitarian work he impressed himself no less forcibly on the life of his time. Of the devout laity, educated at Harvard College, giving themselves to public service, living private lives of dignity and piety, Samuel Sewall, whose diary preserves the true flavor of ancient Boston, stands as an admirable type. In contrast with the background of lives like his, the society of which royal governors were the central figures presents a less austere picture. About the governors, established from 1716 onward in a sort of vice-regal state in the Province House, gathered the more worldly element of the place—prosperous merchants, officials of the Crown, members of the King's Chapel congregation and the two other Anglican churches established before the middle of the century. Under the Province charter religious liberty was increasing, and churches of various denominations—including even the Quakers, whose first representatives in Boston were hanged on the Common—had come into being. Meanwhile the constant friction between the governors and the General Court, always meeting in Boston, kept the spirit of political independence wide awake. A fruitful source of trouble was the annual grant voted by the court to the governor. A salary the people steadily refused to pay to an official not of their own choice; and the amount of the grant varied according to the personal popularity of the chief magistrate. Through all these years, moreover, the town-meeting was educating the people in self-rule, so that when the time was ripe for active opposition from American colonists to the colonial government of England, the men of Boston were ready to take a leading part in the struggle.

In 1761 James Otis, advocate-general of the province, resigned his position under the Crown in order to contest the Writs of Assistance,

which permitted customs officials to enter any house, search for smuggled goods, and on suspicion seize what they might find. The argument against these writs was the first of many conspicuous acts of resistance to royal authority. In 1765 the Stamp Act, taxing many articles of daily use in the colonies, was passed by Parliament. Its principle was bitterly resented in Boston, where riotous outbreaks soon took place. A mob completely destroyed the house of Thomas Hutchinson, chief justice of the Province, and was properly denounced by respectable citizens. In the next year the repeal of the act was joyfully celebrated by all classes. In 1770 occurred the "Boston Massacre" (q.v.), the result of friction between the inhabitants and the British troops stationed in the town. In the use of "a word which historians apply to such events as Cawnpore or the Sicilian Vespers"—the word "massacre" to describe "the careless shooting of half a dozen townsmen"—John Fiske finds "all the mildness of New England civilization brought most strikingly before us." The town-meeting was even more typical of this civilization, and from its training Samuel Adams, at about this time, stepped into virtual leadership of the revolutionary cause in Boston. The Committee of Correspondence was formed upon his motion, and out of it grew by degrees the union not only of towns, but of colonies, in their opposition to the throne. On 16 Dec. 1773, occurred the "Tea Party," a cleverly planned and executed plot for throwing into Boston harbor, by men disguised as Mohawk Indians, the cargoes of three vessels bearing tea upon which the people of Boston would not pay the hated tax. Parliament retaliated by passing the Boston Port Bill, which closed the harbor and brought the chief industry of the town, its maritime trade, to a standstill. A military governor, Gen. Gage, took the place of Hutchinson, who had been acting as the chief civil magistrate, and open hostilities were at hand.

The events of 19 April 1775—the warning ride of Paul Revere, the escape of John Hancock and Samuel Adams, the fights at Concord, Lexington, and along the road between the two towns—are the commonplaces of American history. They belong to Boston in so far as the Boston revolutionary leaders were concerned in them, and as the British troops set forth from the town and returned to it defeated. The battle of Bunker Hill in Charlestown, 17 June 1775, bears much the same relation to Boston history. On 3 July Washington arrived in Cambridge and took command of the American army, which from that time until the following March kept the British closely within the lines of the siege of Boston. Many of the inhabitants were permitted early to depart. Those who remained suffered hardships and privations, besides witnessing the destruction of much American property, and such scenes of desecration as the use of the Old South meeting-house as a riding-school. On the night of 4 March 1776 Washington made his memorable seizure of Dorchester Heights (now South Boston), and on the 17th Howe with all his army and a large following of American Tories sailed for Halifax. Thereupon Washington entered the city, and even before the signing of the Declaration of Independence Boston ceased to be a scene of active warfare in the long conflict. Yet John Adams, Hancock, and other Boston men bore



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an important part in the counsels of the young nation, in whose army and navy the town was fully represented.

The recovery from the effects of the siege was slow. To take the place of the departed Tories, and to occupy their spacious houses, there was in the remaining years of the 18th century a gradual immigration from the neighboring country (where Tories were few) of families possessing wealth, energy, and qualities of leadership. Local government by town-meeting was resumed. In 1780 a State government for Massachusetts was formed, and John Hancock was chosen the first governor. In the general readjustment maritime affairs took their previous place of importance. Cut off by British legislation from the West India trade, the Boston merchants looked farther abroad. The prospects of the fur trade on the northwest coast of America became known through Capt. Cook's journals, published in 1784. In 1787 two small vessels, the *Columbia* and the *Washington*, sailed from Boston to attempt this trade. Before her return in 1790 the *Columbia* had circumnavigated the globe—first of American vessels to accomplish this feat. The furs collected in the Northwest had been sold in China, and the example thus set led the way to an important trade with the East in which Boston long maintained the American supremacy. In such a seaport as Boston, Jefferson's Embargo and the War of 1812 were naturally unpopular. The Federalist party, moreover, had much of its best strength in Boston. The powerful mercantile class saw its best interests in a strongly centralized government and conditions of general stability. The opinions of this class colored the influential feeling of the community to an extent which laid Boston open to charges of something very near disloyalty to the national government. The crippling of commerce, however, had the good effect of turning capital and energy toward manufacturing. In 1814 Francis C. Lowell, of Boston, made the first American use of the power-loom in his mill at Waltham at almost the same time with its introduction into England. The growth of the great cotton industry at Lowell followed rapidly upon this invention. With the spread of manufactures Boston itself was growing. In 1820 its population was over 43,000. The old form of town government had become unwieldy. For some years efforts had been making toward the adoption of a city charter. In 1822 this was finally achieved.

From the time of this change in local government to the present, the outward growth of the city, as figures can speak for it, has been unbroken. In matters not computed in this way, the development has been in several important respects unique. With Boston, for example, the Unitarian movement in America is especially associated. Before the town became a city there were divisions among the clergy of Congregationalism—practically the established order in New England—on various doctrinal points, notably that of the Trinity. Under the leadership of William Ellery Channing the "liberal" clergy and most of the older and more influential religious societies turned from Calvinism to the new theology. Especially between 1820 and 1830, an acute controversy took place. Between 1840 and 1850 the Unitarian body itself was disturbed by differences between the more conservative

element and the radicals, of whom Theodore Parker was a type. The result of the successive controversies has been a liberalizing of religious beliefs not only in what came to be Unitarian Boston, but in the many Protestant bodies which now acknowledge an important debt to Unitarianism. Another far-reaching movement which had its headquarters in Boston was that of anti-slavery. Here in 1831 William Lloyd Garrison established his journal, the *Liberator*. A year later the first anti-slavery society in America was established in Boston. The agitation of the Abolitionists was for a long time opposed by the conservative class, which resorted even to mob violence in the hope of suppressing the reformers. But to Garrison and his associates it was due, as Mr. J. F. Rhodes has said, "that slavery became a topic of discussion at every northern fireside." When the Civil War broke out, the cause of the union, perhaps even more than that of abolition, enlisted the enthusiastic support of the Boston community; yet, as if in fulfilment of the work which Garrison began, it was from Boston that Gov. Andrew sent forth the first regiment of colored troops raised in the North.

With Boston and its immediate vicinity, moreover, are associated the names which stand for the most important contribution of the 19th century to American literature. Prescott, Ticknor, Bancroft, Motley, and Parkman; Emerson, Hawthorne, Lowell, Longfellow, Holmes, and Whittier,—these and their associates, bound together by many ties of sympathy and friendship, constituted a group of writers which gave the place a unique distinction in letters. The '*Atlantic Monthly*,' founded in 1857, became the vehicle for much of their most characteristic utterance. The influences of Transcendentalism (largely a local movement, culminating in the forties), of anti-slavery feeling, of creative expression, combined to give to this utterance as a whole something of the distinction which the individual writers won each for himself.

During the 19th century two important changes in the Boston landscape affected the future of the city, in the regions both of residence and of business. The first of these was the filling in of the Back Bay, an arm of the Charles River which spread between the Common and the hills of Brookline, running south and east as far as the Neck or narrow strip of land connecting Boston and Roxbury. From the early years of the century changes in the shore line of Boston had been wrought by cutting down the principal hills and filling out the irregularities of the harbor front. The first step in the series of events which led to the conversion of the Back Bay from water into land was the granting of a charter in 1814 to the Roxbury Mill Corporation, permitting the building of dams across the Back Bay and confining its water for mill purposes. To these rights the Boston Water Power Company succeeded in 1832. At about the same time the Boston & Providence and Boston and Worcester railroads invaded the Back Bay with their bridges. Moreover the waters became unsanitary through drainage, and to solve the entire problem, hygienic and legal, a State commission was appointed, and made a full report in 1852. Its recommendations to create the whole tract of land now known as the Back Bay did not at once satisfy the various conflicting interests,

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but in 1858 the actual work of filling up the waters was begun. The result was a large enrichment of the State treasury, and the addition to the city of the whole district occupied by the residences, clubs, churches, hotels, and other institutions connected with the most prosperous life of the city. The original peninsula of Boston contained 783 acres. Through its encroachments upon water, largely in the Back Bay, it has grown to 1,829 acres. With the accessions of outlying districts, the total area of the city is now 23,707 acres.

The second great change in the outward aspect of Boston resulted from the great fire of 9 and 10 Nov. 1872. From the beginning of its history Boston had been afflicted by serious fires. This greatest of them all destroyed 776 buildings, all but 67 of which were of brick and stone. It devastated Summer Street (both sides), Washington Street from Summer to Milk, Milk Street to the post-office, Devonshire Street, Water (both sides), Congress, Lindall and Oliver streets to the harbor. From the corner of Washington and Franklin streets the shipping at the wharves was in clear view. Nearly 2,000,000 feet of land were burned over. The total loss was estimated at more than \$75,000,000. Yet by private enterprise and State aid the recovery was immediate. The opportunity to widen and straighten streets in the business district was seized. Statelier buildings rose in the place of those destroyed, and a new business region, corresponding to the new district of residences, was created.

The census of 1900 gave the population of Boston as 560,192. The metropolitan district, including the 38 cities and towns of which Boston is the centre, has by the same census a population of 1,162,197. The territory within 50 miles of Boston has 2,849,686 inhabitants—a population second in America only to that in the corresponding area about New York. The assessed valuation of all taxable property in Boston itself is \$1,191,308,100—a figure surpassed in the United States only by the corresponding figures for New York and Philadelphia.

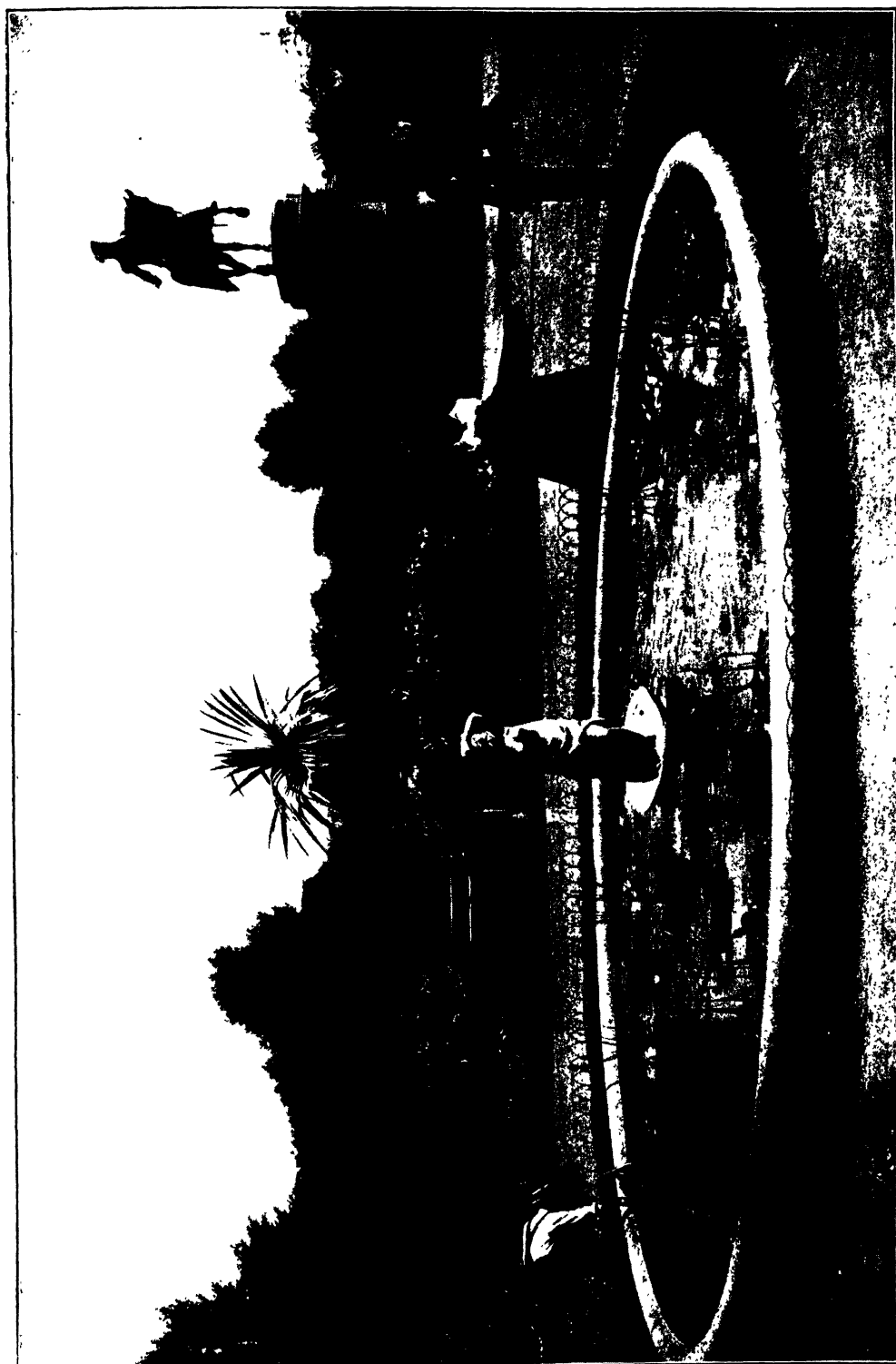
The city government is conducted by a mayor, elected for two years, salary \$10,000; a board of 13 aldermen, elected annually; and a common council of 75 members, three for each ward, elected annually. The fire department is controlled by one commissioner, the police and health departments by three each. The school committee consists of 24 members, of whom 8 are elected annually for a term of three years. In the 807 public schools under their charge there were, according to the 'Boston Municipal Register for 1902,' 1,939 teachers and 84,778 pupils.

The park system of Boston is under the joint control of the Metropolitan Park Commission (appointed by the governor of Massachusetts) and the Board of Park Commissioners (appointed by the mayor of Boston). These commissioners serve without pay. In the Metropolitan system are included the Blue Hills Reservation (4,232 acres), the Middlesex Fells and Mystic Lakes (3,002 acres) and smaller reservations, including 66 acres at Revere Beach, where the State bath-house of 1,000 rooms provides the best facilities for sea-bathing. To the Board of Park Commissioners falls the management of the Marine Park at South Bos-

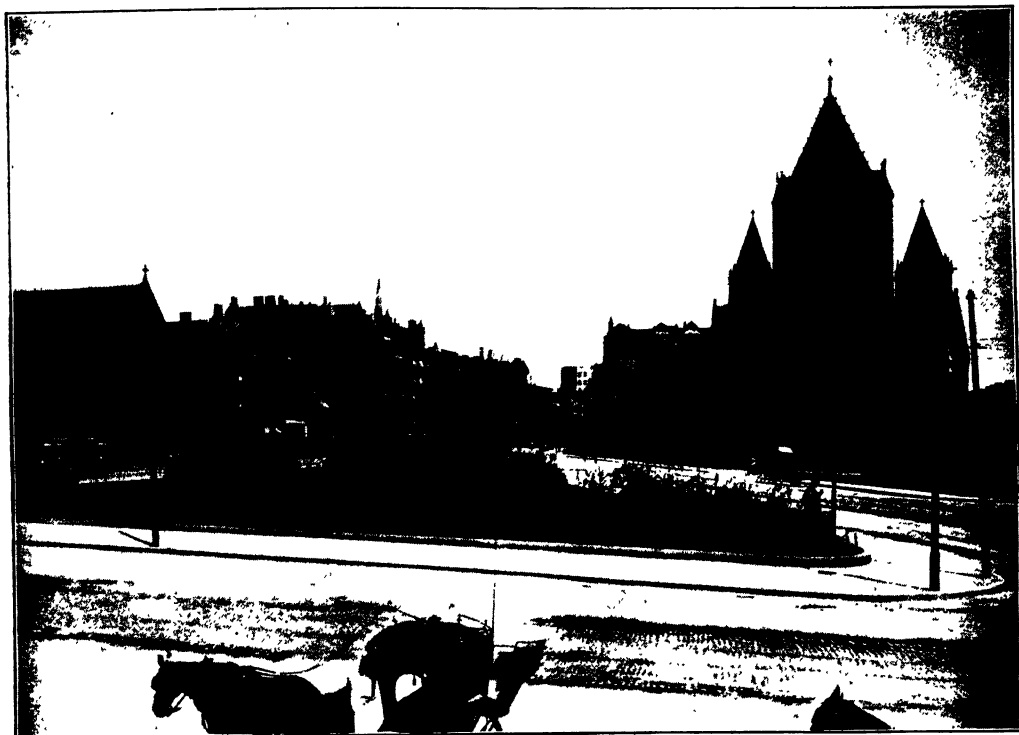
ton, Franklin Park at West Roxbury, Arnold Arboretum at Forest Hills, boulevards, fens, playgrounds, and open-air gymnasias. The Common (48 $\frac{3}{4}$ acres) and the adjoining Public Garden (24 $\frac{1}{4}$ acres), both in the heart of the city, are in charge of the Public Ground Department of the city of Boston. The State commission acts in consultation with local boards, including that of Boston, and serves the people of 12 cities and 25 towns within a radius of 25 miles from the State House. The general park system thus provided is remarkable for its beauty, accessibility, and actual benefit to the community. The work of the city bath department is a characteristic example of municipal service to the people. The five trustees of this department maintain seven beach baths, one river bath, two swimming-pools, nine floating baths, five gymnasias, and the Dover Street bath-house, a model building with free baths for men and women throughout the year. Metropolitan commissions of water and sewerage corresponding to the Park Commission, serve the city and surrounding towns. The water-supply is drawn from lakes and rivers in eastern Massachusetts,—the Sudbury River, Mystic Lake, Lake Cochituate, and watersheds of wide area. A city water department does its separate work in connection with the Metropolitan Commission.

The churches of Boston, according to the 'City Directory' of 1902, are 309 in number. Of these 50 are Roman Catholic (including Polish, German, Italian, French, Portuguese, and Syrian parishes), 38 are Baptist, 37 Congregational-Trinitarian, 34 Methodist-Episcopal, 32 Protestant Episcopal, 25 Congregational-Unitarian, 13 Lutheran, and 10 Universalist, with others in smaller numbers. The First Church of Christ (Scientist) is the "mother church" of "Christian Science" throughout the country and the world. Charitable organizations, both municipal and private, abound, and enlist the unpaid services of a large class in the community. An admirable organization of Associated Charities gives direction to the proper sources or seeks to obtain therefrom for the sick and needy adequate and suitable relief. The principal hospitals are the Boston City Hospital, a city institution, the Massachusetts General, supported by private endowment, the Carney, in charge of Roman Catholic Sisters of Charity, and the Massachusetts Homœopathic. These are open to persons of all races and creeds. In the Massachusetts General Hospital in 1846 the properties of ether as an anæsthetic were first demonstrated. From the discovery then made the progress of modern surgery took its first great step. There are, besides the institutions mentioned, many smaller hospitals for special classes, children, women, etc. The provisions for industrial training and the education of defectives are ample. The Perkins Institution and Massachusetts School for the Blind (incorporated 1829) typifies the good work they have done and are doing. Here Dr. Samuel G. Howe did his memorable pioneer work in the case of Laura Bridgman.

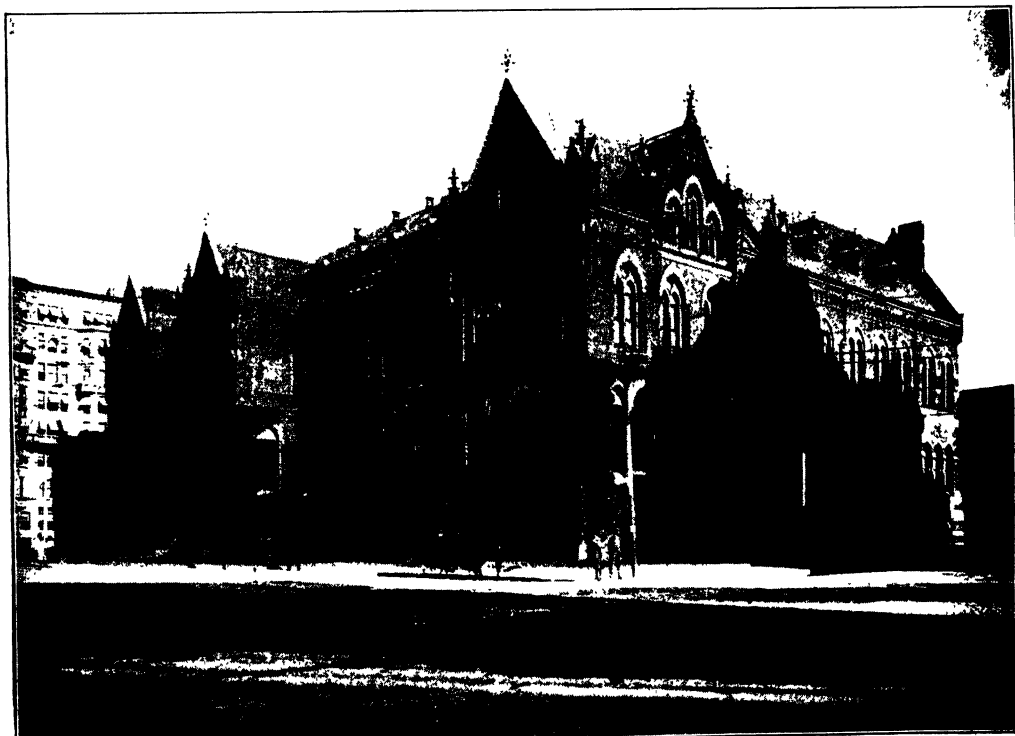
As a centre of higher education in many branches Boston attracts and maintains a large population of students. The Public Library, housed in one of the most beautiful buildings in the country, and distributing its more than 800,000 volumes through 10 branch libraries and 21 delivery stations throughout the city, puts the



PUBLIC GARDENS AND EQUESTRIAN STATUE OF GEORGE WASHINGTON, BOSTON



COPLEY SQUARE, BOSTON.



MUSEUM OF FINE ARTS, BOSTON.

BOSTON CASE—BOSTON MASSACRE

materials of scholarship within the reach of all. Harvard University is close at hand. Its Medical School is in Boston itself. Here also are the Massachusetts Institute of Technology, Boston University, the Boston Museum of Fine Arts, with its School of Drawing and Painting, and the New England Conservatory of Music, supplemented by the concerts of the Boston Symphony Orchestra. The courses of free lectures provided by the Lowell Institute, established in 1838, with an original endowment of \$37,000, have made a constant contribution to the cause of general education. If the suggestion to co-ordinate these and the many other educational institutions of Boston into a general university is ever carried out, the place may well become one of the foremost centres of organized learning in the world.

In 1894 the Union Station at the North End of the city brought together the terminal facilities of all the railroads connecting Boston with northern New England, with Canada, and, through Fitchburg, with the West. On 1 Jan. 1899 the first train entered the South Station, the largest railway terminal in the world. Here the railroads connecting Boston with southern New England, New York, the South, and the West, by way of Albany, meet under one roof. The North and South Stations are connected both by surface and by elevated electric cars—a part of the system of the Boston Elevated Railway. This company has succeeded to the rights of the several street railways formerly holding franchises, and by surface cars, elevated lines, and subways, upon which the underground systems of other cities have been modeled, gives the city, with the attractive and accessible suburbs for which Boston has always been noted, a rapid-transit service of unusual comfort and effectiveness. The subway system will be still further extended, first of all by the completion of the tunnel now building under the harbor to connect Boston and East Boston.

In the Rivers and Harbors Bill passed by the United States Congress in June 1902 an appropriation of \$3,600,000 was made for the improvement of Boston Harbor. Its expenditure in making a broader and deeper channel from Charlestown and Chelsea bridges to the sea is expected to forward the progress made in recent years by Boston as a seaport. Its ample harbor, well protected from the sea by islands, has always played an important part in the life of Boston. In foreign commerce for the government fiscal year ending 30 June 1902, Boston stood second in the United States only to New York, with imports and exports valued at \$172,325,740. For peculiar temporary causes this was smaller by more than \$40,000,000 than the volume of trade for the year before. Fourteen transatlantic steamship lines run from Boston. The coastwise commerce of the port is valued, in merchandise, in sums ranging annually between \$85,000,000 and \$131,000,000. As a wool market Boston stands second in the world only to London. In the single week of 1901, in which Boston made its greatest record in the sales of wool, it sold more than the total clip of any State in the Union, excepting Montana and Idaho, for that year. In the business of shoes, leather, and hides, Boston is the chief distributing centre of the United States. The trade in salt and fresh fish—as befits the capital of the State with a cod for its emblem—

is larger than in any other city of the country. The cotton industry of Massachusetts looks to Boston for much of its capital and control. Miscellaneous trades and manufactures, added to the branches of business enumerated, give Boston a high place among the commercial and industrial cities of the country.

In the growth from an ancient to a modern city many historic buildings have inevitably disappeared. But Boston is fortunate in a few of those that remain. Chief among these are Christ Church (1723), the Old South Meeting-house (1729), Faneuil Hall (1742, enlarged in 1806), the Old State House (1748), King's Chapel (1749, built around the previous wooden church erected in 1688), the front portion of the present State House (1795-8), and Park Street Church (1809).

'The Memorial History of Boston' (Boston 1881) in four volumes, edited by Justin Winsor, completely covers the local history from 1630 to 1880. Its chapters are written by persons with special knowledge of the themes assigned them. 'Boston,' by Henry Cabot Lodge in the series of 'Historic Towns' (New York 1892) is an excellent shorter history.

M. A. DEWOLFE HOWE,

Author of 'Boston: The Place and the People.'

Boston Case, in the history of slavery, a case where a Georgia slave hid or was hidden on the ship Boston returning from Georgia to Maine, and on arrival escaped to Canada. The governor of Georgia issued a requisition to the governor of Maine for the surrender of the captain to the Georgia authorities, as a slave-stealer and fugitive from justice; and on his refusal, the Georgia legislature demanded that Congress pass a law obligating the governor of Maine and all others in similar cases to comply with the requisitions. The resolution was warmly advocated by the Georgia senators, referred to the judiciary committee, and never reported on. In his next message, the governor of Georgia recommended that "all citizens of Maine who should thereafter come within the jurisdiction of Georgia on vessels, either as owners, officers, or mariners, should be considered to have done so with intent to commit the crime of seducing negro slaves from their owners, and be dealt with accordingly by the officers of justice."

Boston College, an educational institution in Boston, Mass.; founded in 1864; under the auspices of the Roman Catholic Church. Professors and instructors, 20; students in all departments, 477; scholarships, 15; volumes in the library, 34,109; value of grounds and buildings, \$537,000; income, \$17,000; and benefactions, \$3,000. The course is four years leading to the usual academic degrees.

Boston Massacre, a riot in Boston, 5 March 1770, provoked by the presence of the British regiments quartered there since 1 Oct. 1768. On Friday the 2d, some ropemakers started a war of insults with passing soldiers, and on being challenged to a boxing match, used sticks instead, to which the soldiers retorted with cutlasses; several persons were hurt when the fray was stopped by outsiders, but it was reported that it would be resumed Monday. Early Monday evening the soldiers passing to their posts from the main guard, at the head of King (State) Street, were met by a crowd

BOSTON MOUNTAINS—BOSTON PORT BILL

armed with canes and sticks, who refused to make way, and shouted insults; the soldiers were about to force a passage when an officer came up and ordered them into the yard; but the alarm-bell had called out the citizens, the hot-heads wished to assault the main guard, and apparently they and the boys set to harrying the sentinel in front of the custom-house opposite the main guard, who about 9 o'clock hit a specially annoying boy with the butt of his musket. The boy ran off and brought a crowd to the spot, headed by one Crispus Attucks (q.v., apparently a half-breed Indian), and pointed out the sentinel, at which they shouted "Kill him! Knock him down!" The sentinel retreated up the steps and loaded his gun amid a shower of snowballs and other missiles; told Henry Knox who was passing, and counseled him not to fire; that he would if they touched him; leveled the gun and warned off the crowd, and called for help from the main guard across the street. A sergeant and seven men were sent to his help, and he came down and took his place in line; soon afterward Col. Thomas Preston joined them, making 10 in arms. They loaded; the crowd jeered, hooted, taunted them as cowards, dared them to fire, and closed about them; the soldiers drove them back with clubs and bayonets; Preston, in turn warned by Knox, rushed among his men, and either with or without his orders they fired, killing Attucks and two others and mortally wounding two more. The crowd fell back, and Preston prevented the men firing again and rejoined the main guard. The drums beat to arms, and the vicinity was soon thronged with divisions of soldiers and masses of enraged citizens. Lieut.-Gov. Hutchinson quieted the tempest by having Preston bound over for trial, placing the implicated soldiers under arrest, and inducing the officers to order the companies back to barracks; but the next day a town-meeting forced Hutchinson to have the regiments removed to the Castle in the harbor. Preston was tried in October and the soldiers in November before the Superior Court, and defended by Robert Auchmuty, assisted by John Adams and Josiah Quincy, who took their futures in their hands from professional duty; Preston was acquitted, six soldiers were brought in not guilty, and two found guilty of manslaughter, branded in the hand, and discharged.

Boston Mountains, a range in western Arkansas, extending into the Indian Territory; highest summits, 3,000 feet above the sea.

Boston News Letter, 1704-76; the first real newspaper issued in America. A periodical called 'Publick Occurrences,' to be issued monthly, or oftener if "a glut of occurrences" made it advisable, had been essayed in Boston by Richard Pierce, 25 Sept. 1690; but it was instantly suppressed by the authorities as containing "reflections of a very high nature," and the first number was the last. The next venture was by John Campbell (q.v.), a Scotch bookseller and postmaster of Boston, who had been actively writing and sending "news letters" of European occurrences to New England governors for a year or more, and thought it would save trouble to print them for all. With official permission he issued on 24 April 1704 the first number of a weekly consisting of a single leaf, 8 x 12, printed on both sides, and dated

"From Monday April 17. to Monday April 24. 1704." It was printed by Bartholomew Green, for many years one of the best printers of Boston, who in 1722 became its editor. Dying in 1732, he was succeeded by his son-in-law, John Draper, who conducted it till his death in 1762, and made it a representative of the best interests of the province; he was a journalist of the highest character. His son Richard Draper, considered the best news compiler of his day, though in feeble health, edited the paper till his death in 1774, when his widow succeeded him and carried it to the end. Draper had been an ardent loyalist, and firmly supported the mother country in the stormy times of the previous decade; his widow naturally shared his feeling, and when the young man Robert Boyle whom she installed as editor showed sympathy with the Revolution, she replaced him by John Howe, who conducted it till the British evacuated Boston, 17 March 1776, when he and Mrs. Draper left with them and the paper ceased to exist. The British government gave her a life pension. There are only three copies of the first number extant: in the Massachusetts Historical Society at Boston, the American Antiquarian Society at Worcester, Mass., and the New York Historical Society at New York. A facsimile of the first page is given in the 'Memorial History of Boston,' Vol. II., page 389.

Boston Port Bill, of 31 March 1774, was Great Britain's retort to the destruction of the tea in Boston harbor, 16 Dec. 1773. (See BOSTON TEA PARTY.) The maintenance of English authority by force, or abdication in favor of a party which would maintain it, were the only alternatives left to the government. The King's Speech of 7 March 1774 charged the colonists with attempting to injure British commerce and subvert the constitution; and on the 18th Lord North brought in the Port Bill, providing that there should be no further "landing or discharging, lading or shipping of goods, wares, and merchandise at the town and within the harbor of Boston" till the town paid for the tea and promised submission to the laws; that the colony's seat of government should be removed to Salem, and Marblehead made a port of entry; the act to take effect 1 June. Even some of the best friends of America in Parliament at first approved it as moderate and reasonable, as the town could end the punishment at any moment by paying for legitimate merchandise destroyed by riot, and allowing law and order to have their course; but the Whig opposition soon collected itself, and the bill was fought in its various stages by Burke, Barre, Pownall, and others. In spite of them it became a law 31 March, without a division in the Commons, and by unanimous vote in the Lords. The fleet and army were of course to join in enforcing the blockade; Boston was filled with troops, and Gage made commander-in-chief. The immediate results were: a flood of contributions from the other New England towns, of grain and provisions, so great that the Boston leaders boasted that it would become the chief grain port of America if the act were not repealed; and, in connection with the regulating acts for changing the government of the province passed soon after, a speedy union of the colonies for joint defense.

BOSTON SYMPHONY ORCHESTRA — BOSTON TERRIER

Boston Symphony Orchestra, a large orchestra organized in Boston in 1881, having about 80 members in 1903. It gives a series of concerts in Boston annually, and in 1900 inaugurated a series of Wednesday afternoon concerts in New York. Daily rehearsals are the rule throughout the season, and the orchestra plays only at concert performances. The conductors are now appointed for five years; the conductor in 1903 was William Gericke; others who have held the position are, George Henschel, the first, Arthur Nikisch, and Emil Paur.

Boston Tea Party, 16 Dec. 1773. Till shortly before the Revolution, imported teas paid a shilling a pound duty at English ports; but the merchants received a drawback of three fifths on exports to the colonies, who were charged the remaining 4 $\frac{1}{5}$ d. in the selling price. As they obtained it more cheaply by smuggling from Holland, there was no English tea trade. In 1767, as part of a series of duties to raise revenue for paying the colonial executives and judiciary, to make them independent of popular control, this duty was reduced to 3d., but to be collected at American ports. This was done with the threefold object of aiding the straitened East India Company to market its tea; substituting a small collectible duty for a larger uncollectible one; and helping to break up the illicit free-trade which was the life of the colonies. The political purposes made Americans invincibly hostile to it. Associations were formed to abstain from the tea, merchants who handled it lost custom, and the Dutch smuggling went on. In 1770 the other new duties were repealed, but that on tea remained. In 1773 the East India Company, with 17,000,000 pounds of unsalable tea stored in London warehouses because of this non-importation, and in imminent danger of a failure most disastrous to English financial and political interests, asked Parliament for a colonial drawback of the entire shilling, to undersell the Dutch. This was granted to May, tea ships were sent to Boston, New York, Philadelphia, and Charleston, and consignees or "tea commissioners" appointed in each place. But the colonies were now resolved that no taxes, external or internal, should be paid except under their own control, and set themselves to prevent the collection of the duty. In the other cities than Boston this was done by forcing the consignees to resign, and in New York and Philadelphia the ships were sent back without unloading. In Charleston the duty was left unpaid for 20 days, when by law the customs officers seized it and offered it for sale to pay the charges, but as no one dared buy it, it spoiled unused. In Boston the tax was defeated by the refusal of the consignees — two sons of Gov. Hutchinson and three loyalist friends of his, to resign. On Sunday, 28 November, the Dartmouth, under Capt. Hall and owned by the Quaker Francis Rotch, arrived with 114 chests of tea, and was moored at Griffin's wharf. The committee of correspondence which really governed the province, induced Rotch to defer its entry until Tuesday, and on Monday morning called a great mass meeting at the Old South Church, which resolved that Rotch would enter the tea at his peril. The captain was cautioned to let none be landed, and a watch of 25 men was stationed at the wharf. The consignees, asked to send

the tea back, replied that it was not in their power, but they would store it till they could hear from their constituents. Tuesday afternoon, however, Rotch and Hall agreed to return it without its touching land or paying duty; and the owners of two other ships which arrived shortly after, the Eleanor and Beaver, made the same promise. These ships were moored at the same wharf, so that one guard might serve for all. But by law the ships could not be cleared till the cargo was discharged, and Hutchinson refused to give the owners permits to pass the Castle; had the guns loaded, and Admiral Montagu guarded the mouth of the harbor with two war-ships, though curiously neither of them put a guard on the tea ships. At midnight on the 16th, the Dartmouth's 20 days would expire, and the American victory be practically won by the seizure of the tea for unpaid duty, since none of it would come on the market. But the object of the Boston leaders was not merely to prevent the English exchequer profiting, but to commit the colony to open disobedience of English orders, and have some issue to unite upon with the other colonies. On the 14th Rotch was again ordered by a meeting at the Old South to apply for a clearance, and several leading patriots escorted him to the custom-house to see that he did so. The collector refused to give an answer till the next day, when, upon a final visit from Rotch and his volunteer bodyguard, he definitely refused unless the teas were discharged. At 10 the next morning Rotch appeared before another huge meeting at the Old South and reported the refusal. He was directed to protest against it at once, and apply to Gov. Hutchinson for a permit to pass the Castle. Hutchinson was at his house on Milton Hill, some eight miles out; and it was 6 p.m. before Rotch returned with the news that the governor also refused. Meantime some 7,000 people had gathered in and about the Old South, probably half of them from neighboring towns; addresses were made by Samuel Adams, Josiah Quincy, and several other leaders, and it was unanimously resolved that the tea should not be permitted to land. Hutchinson's refusal had been discounted, and 40 or 50 men disguised as Indians, with paint and gear, had gathered in the back room of a printing office near by, waiting for an agreed signal, and the meeting continued in session till long after dark, waiting Rotch's report. On receiving it, Samuel Adams gave the appointed signal, "This meeting can do nothing more to save the country," and a shout from the porch was answered by a war-whoop from the "Mohawks"; who at once rushed to the wharf followed by a thousand or so of others, and with perhaps a hundred of them boarded the ships, and for three hours worked steadily with hatchets, breaking open the chests and throwing the tea into the harbor. The entire 342 chests on the three ships, valued at about £18,000, were destroyed, without a sound from the mob, which then dispersed. Meantime a fourth tea ship was wrecked off Cape Cod. The immediate result of this was the Boston Port Bill (q.v.); but as the Bostonians had expected, the whole country rallied to their support.

Boston Terrier, a breed of dogs, resembling bull-dogs without their eccentricities, which originated in Boston about 1870, and

BOSTON UNIVERSITY — BOSWORTH

soon became popular for its admirable qualities as a companion. This terrier has a shapely bull-dog-like head, and the straight legs and active manners of the old bull-terrier. Those truly bred always have a white muzzle, a white blaze on the face and on the chest and feet, with a fine coat, short and bright, and a deep broad chest. Light-class ones weigh from 15 to 23 pounds, and the heavy from 23 to 30 pounds. This breed arose from a cross between Robert C. Hooper's "Judge" (a dog three quarters English bull and one quarter white terrier, which was a rich dark brindle with a white flare on his face), and Burnett's "Gyp," a pure white bitch low on the legs and stockily built, not unlike the old-fashioned bull-terrier. The product was Wells' "Eph." He was born in Boston about 1870 and was bred to Tobin's "Kate," an old-fashioned bull-terrier, and the result, Barnard's "Tom," may be said to be the first of the real new breed, for he developed the typical screw tail of the present Boston terrier. This dog has a most affectionate disposition, is well knit in build, and is stylish.

Boston University, a co-educational institution of Boston, Mass., organized in 1869. The work is divided into two main departments, the Schools, requiring previous college training, and the Colleges requiring no such qualification. The schools are those of theology, law, medicine, and all sciences (for post-graduate work in language, philosophy, history, and science); the colleges are those of Liberal Arts and of Agriculture, the latter allied with the Massachusetts Agricultural College at Amherst. In 1900 the number of students was 1,430, and the number of professors and instructors 144; president, W. F. Warren, LL.D.

Boston, a game of cards played by four persons, with two packs of cards. The cards are never shuffled; one of the packs is dealt, and the other cut alternately to determine the trump, which governs the game. The dealer deals five cards to each player twice, and three the last time around. If the first player can make five tricks, he says, "I go Boston"; and his competitors may overbid him by saying, "I go 6, 7, 8, 9, 10, 11, 12, or 13," as the hand of each may warrant. Should either of them fail to make the number of tricks he "bids" for, he must pay to each competitor a forfeit regulated by a card of prices, which must be prepared beforehand. Without such a card Boston cannot be played. It is one of the most complicated of games. It is said to have been introduced into France by Dr. Franklin, who gave it the name of his native city.

Bostonians, The, a novel of American life, by Henry James, published in 1886. Written in a satirical vein, it presents with unpleasant fidelity a strong-minded Boston woman possessed by a "mission," "who takes life hard," is never so happy as when struggling, striving, suffering in a cause which throughout the novel is the emancipation of women.

Boswell, James, English writer: b. 29 Oct. 1740; d. 19 May 1795. He was the son of a Scotch judge, Lord Auchinleck, who took this title from the name of his estate. He was educated at Edinburgh and at Glasgow, and early displayed literary tastes. In 1763, when on a visit to London, he was introduced to Johnson, and though this first meeting was not

very hopeful for the future, a warm friendship soon sprung up between them. During a year spent on the Continent, he made the acquaintance of Voltaire, Rousseau, and other prominent men of the day. Returning in 1766 he was admitted an advocate, but the practice of his profession was little to his taste. In 1768 he published a history of Corsica, with a lively account of his own experiences in the island. The same year he again met Johnson in London, and his intercourse with him was kept up by many subsequent visits to the metropolis; while Johnson himself came to Scotland in 1773, when the pair made their famous journey to the Hebrides. This year also Boswell became a member of the famous Literary Club, with various members of which, such as Burke and Reynolds, he was on terms of intimacy. In 1769 he had married, but he continued mainly dependent on his father till the latter's death in 1782, when he succeeded to the estate. In 1784 he met Johnson for the last time at a dinner at Sir Joshua Reynolds'. Two years after (1786) came out his 'Journal of a Tour to the Hebrides with Samuel Johnson, LL.D.' (Johnson's own account of the tour had appeared in 1775). Having latterly been admitted to the English bar, he went on circuit and held for a year or two the recordership of Carlisle; and from 1788 onward he mostly resided in London. In 1791 appeared his 'Life of Johnson,' a work which he had been long preparing, and which at once gave readers the same delight as it has ever since inspired. A second and enlarged edition came out in 1793. By this time Boswell's health had greatly suffered from his too convivial habits, and he died in London having been a widower since 1790. Boswell was a singular compound of sense and folly, of genuine ability and foible bordering on craziness. His good nature was universally admitted; his vanity and want of self-respect and self-control were his most evident faults. His weaknesses were easily seen, but the man who enjoyed the sincere affection of Dr. Johnson and the enduring friendship of Burke and Reynolds had better stuff in him than appeared to the superficial observer. His life of Johnson is such a masterly performance as only a genius for life-portraiture could have produced. Among editions of the Life may be mentioned that of Croker (10 vols.) and those of Rev. A. Napier (Bohn's Standard Library, 6 vols.), and Dr. Birkbeck Hill (Clarendon Press, 6 vols.), all containing the Tour. See Macaulay's essay, and the much more humane and penetrating essay by Carlyle. Boswell left two sons. The elder, ALEXANDER, born in 1775, succeeded to the family estate, sat for a year or two in Parliament, and was created a baronet in 1821. He wrote several well-known Scottish songs and various other things in verse and prose, and also set up a private press from which issued reprints of rare old works in the Auchinleck library. In 1822 he met his death in a duel with a Mr. Stuart, against whom he had made some severe attacks in a political journal. JAMES, the second son, born in 1779, died in 1822, was the editor of an improved edition of Malone's Shakspeare, generally known as the 'Variorum Shakspeare' (21 vols. 1821).

Bosworth, Francke Huntington, physician: b. Marietta, Ohio, 25 Jan. 1843. He was educated at Yale and Bellevue Hospital Medical

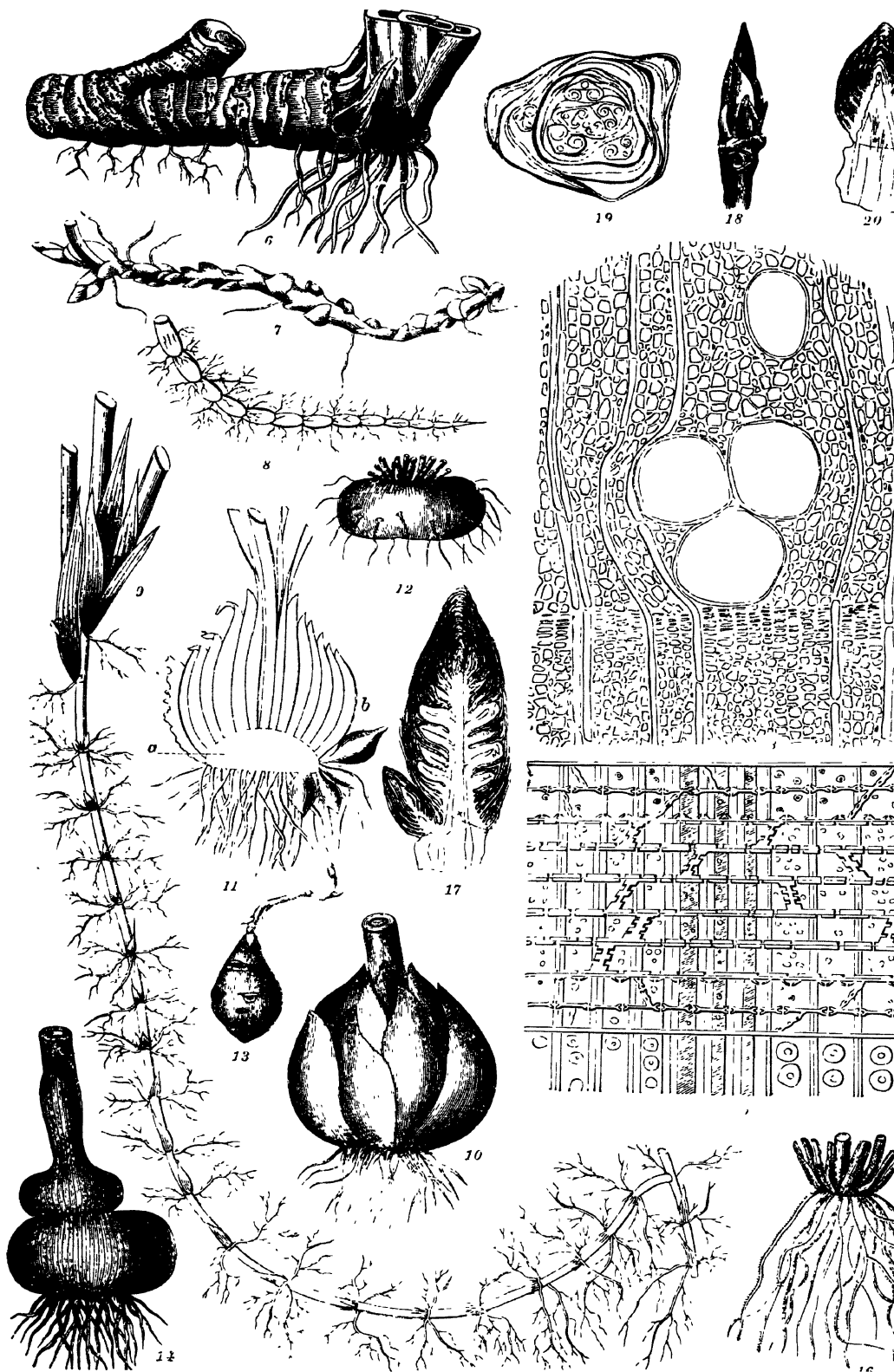
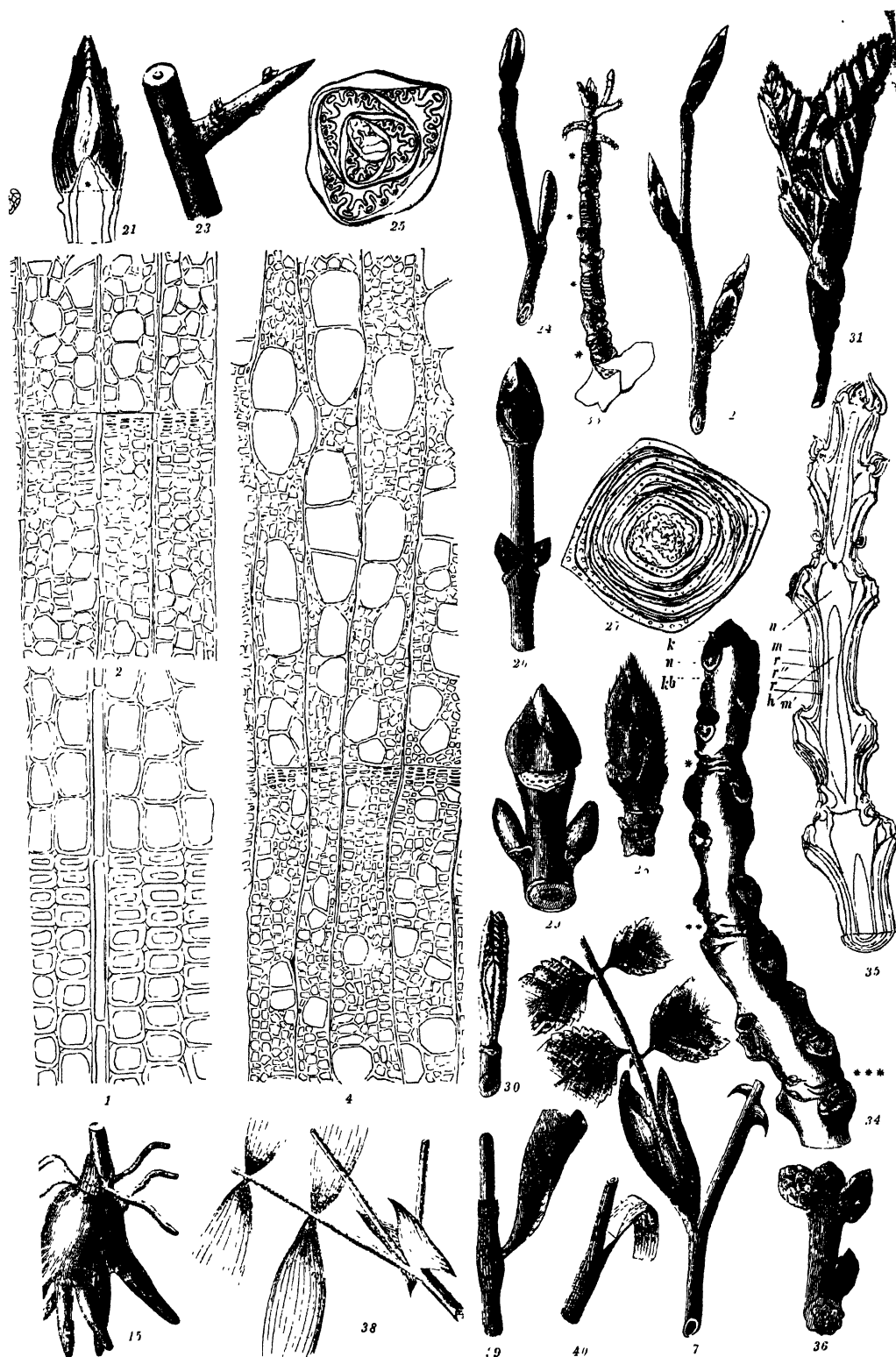
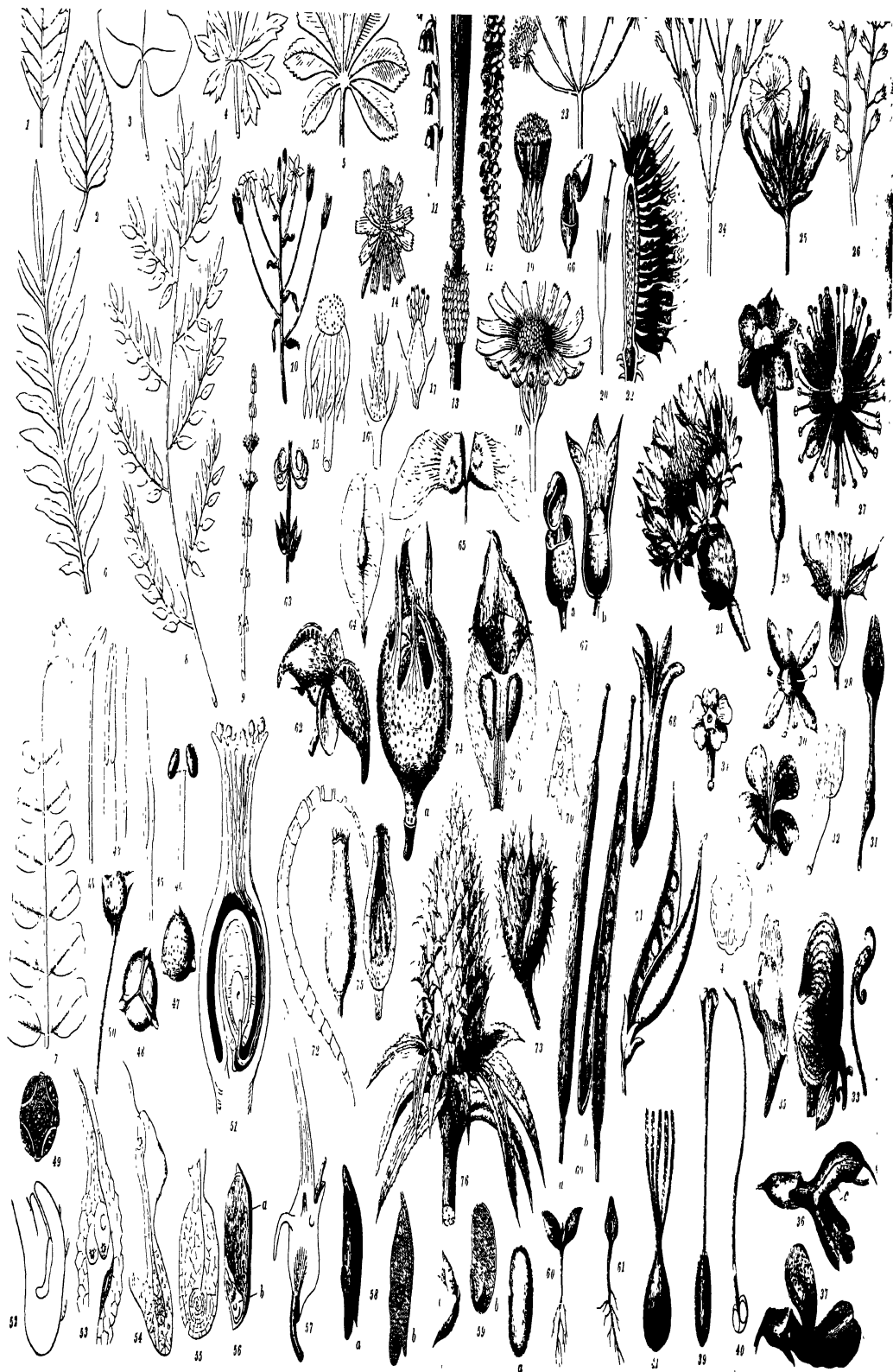


Fig 1 Cross section of the wood of the Spruce Fir 2 Do. of the Lime Tree. 4 Do. of the As
 14, 15 Corms 16 Fibrous Root 17-20 Figures illustrative of growth

BUDS, WOODY TISSUE, &c.

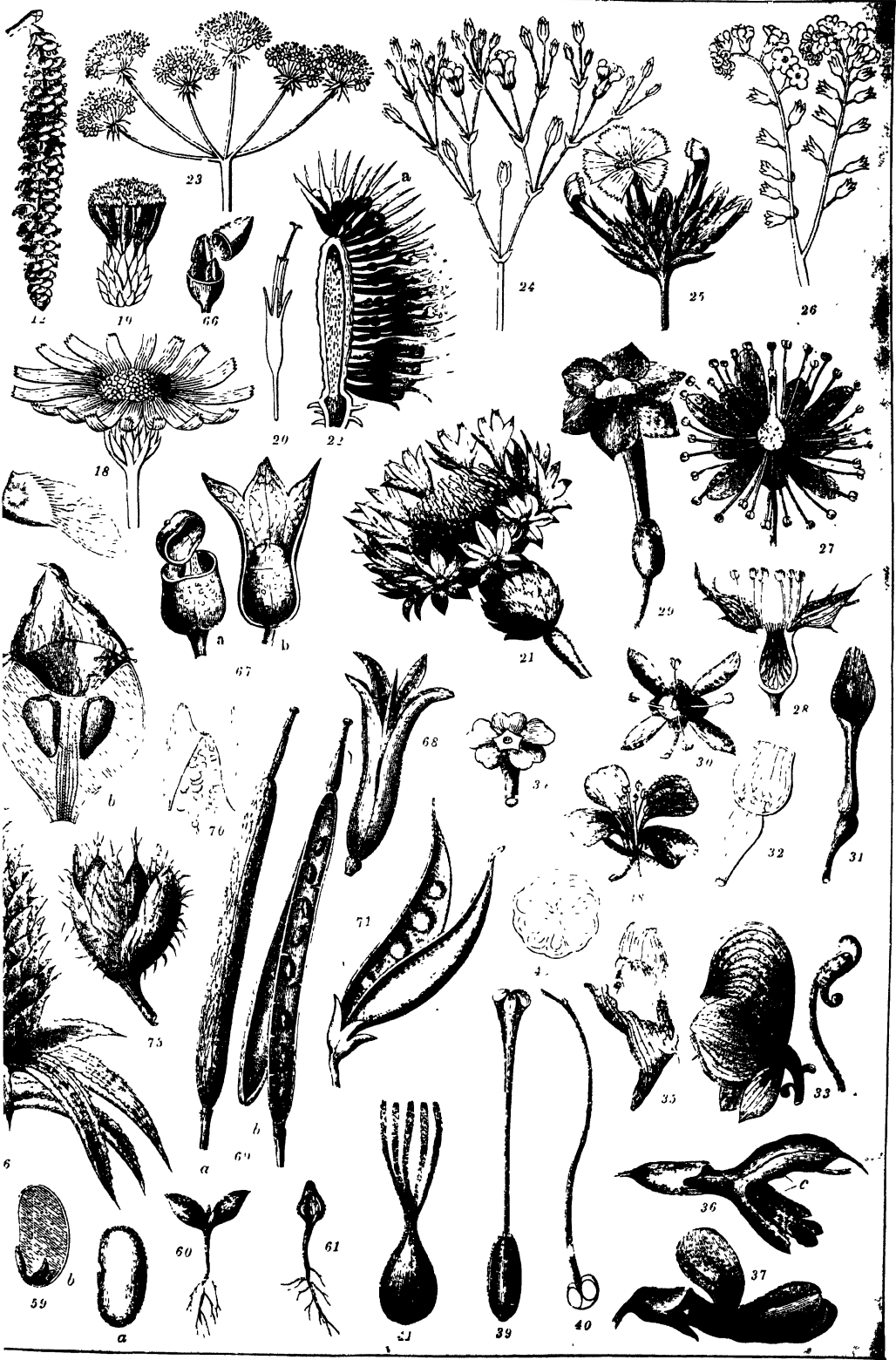


5 Radial longitudinal section of the wood of the Spruce. Figs 6-9 Rhizomes. 10, 11 Bulbs 12, 13 Tubers.
buds and young shoots. 37, 38 stipules of Leaves 39 Ochres. 40 Ligula of Grass



Figs. 1-5 Forms of Leaves. 6-10 Forms of Inflorescence. 11-20 Structure of the Flower and Form of the Floral Envelopes. 21-25 Structure of the Pistil. 26-30 Structure of Anthers and Pollen Grains. 31-35 Process of Fertilization and Embryo Formation. 36-40 Structure of the Seed and Embryo. 41-45 Embryo Plants. 46-63 Forms of Fruits.

LOWERS, FRUITS.



re of the Pistil. 43-50 Structure of Anthers and Pollen Grains. 51-55 Process of Fertilization and Embryo Formation.
o Plants. 56-77 Forms of Fruits.

colleges. He is professor of diseases of the throat in Bellevue, consulting physician to the Presbyterian and St. Vincent's hospitals, and an authority on diseases of the nose and throat. Publications: 'Manual of Diseases of the Throat and Nose' (1881); 'A Study of Nasal Catarrh' (1882); 'Growths in the Nasal Passages'; 'The Three Tonsils'; 'Treatise on the Diseases of the Nose and Throat'; 'Malignant Disease of the Upper Air Tract'; 'Taking Cold'; 'Text-Book of Diseases of the Nose and Throat.'

Bosworth, Joseph, English philologist: b. Derbyshire, 1789; d. 27 May 1876. He was educated at Repton, Aberdeen, and Trinity College, and was ordained deacon in 1814, and after filling several livings in England was British chaplain at Amsterdam and Rotterdam for 12 years. He devoted much time to researches in Anglo-Saxon and its cognate dialects, the result of his studies appearing from time to time. His chief works are his 'Anglo-Saxon Grammar; Dictionary of the Anglo-Saxon Language; and Compendious Anglo-Saxon and English Dictionary.' In 1857 he was presented to the rectory of Water Shelford, Buckingham, and next year was appointed Rawlinson professor of Anglo-Saxon at Oxford, a post which he held till his death. He was M.A. and LL.D. of Aberdeen; Ph.D. of Leyden, and D.D. of Cambridge. In 1867 he gave \$50,000 to establish a professorship of Anglo-Saxon at Cambridge. He left a certain amount of materials that he had accumulated for a new edition of his larger Anglo-Saxon Dictionary, and these have been utilized and greatly added to by Prof. Toller of Manchester in the copious Dictionary which has been published under his editorship by the Clarendon Press.

Bosworth, or **Market-Bosworth**, England, a small town in the county of Leicester, about three miles from which is Bosworth Field, where was fought, in 1485, the memorable battle between Richard III. and the Earl of Richmond, afterward Henry VII. This battle, in which Richard lost his life, put a period to the long and bloody Wars of the Roses, between the houses of York and Lancaster.

Bot-fly. In these flies, so interesting in their habits, the body is stout, hairy, like the humblebees, and they are easily recognized by having the opening of the mouth very small, with rudimentary oral organs. The middle part of the face is exceedingly narrow, and the minute antennæ are inserted in rounded pits. The eggs hatch very soon after laying, and Riley thought, from the testimony of three independent witnesses, that the sheep bot-fly is viviparous, the larvæ hatching within the body of the parent, who deposits in the nostrils of the sheep the perfectly formed and living grub.

The larvæ are, in general, thick, fleshy, footless grubs, consisting of 11 segments exclusive of the head, which are spined and tuberculated, the former in rows, which enable them to move about readily when living under the skin or in the frontal sinus, and thus greatly irritate the animals on which they live. The stigmata are placed in a scaly plate on the thickened posterior end of the body. The mouth of the cutaneous larvæ consists simply of fleshy tubercles, while in those species that live in the stomach and frontal sinuses of their hosts, it is provided with

horny hooks. While in this state they moult twice, and then attain their full size. They feed on the purulent matter originating from the irritation produced by the movements of their bodies. Just before assuming the pupa state, the larva leaves its peculiar habitat, descends into the ground, and there becomes a coarctate pupa (see PUPA).

Besides the horse bot-fly (q.v.), the ox bot-fly (q.v.) and the sheep bot-fly (q.v.), there is included in the genus *Dermatobia* the "ver macaque" of Cayenne and Mexico, which is found beneath the skin of man in tropical America. It is disputed whether it be a true indigenous (*Estrus hominis*), or one that originally attacks the monkey, dog, or other mammal. In Cayenne the species attacking man is called the "ver macaque"; in Brazil (Para) "ura"; in Costa Rica, "torcel"; in New Granada, "gusano peludo" or "muché." The "ver moyocuil" (*D. noxialis*) lives on the dog, sheep, cattle, and man; and is found in Mexico and New Granada. The larvæ are long, cylindrical, S-shaped, differing greatly in form from others of this family. The flies are closely allied to those of the preceding genus.

Leidy states that several specimens of the larva of a bot-fly were obtained in Honduras (by Le Conte). They were usually found beneath the skin of various parts of the body, and the eggs were suspected to have been introduced while the persons were bathing. The men were not aware of the circumstance, and the presence of the larva gave them comparatively little uneasiness.

According to Krefft, a species of *Batrachomyia* is parasitic upon four species of Australian frogs. The larvæ are found between the skin and the flesh behind the tympanum. When they quit the frog the latter dies. The change to the pupa state is usually effected on the lower surface of a piece of rock in some damp locality. The perfect insect emerges in 32 days. Consult: Packard, 'Guide to Study of Insects'; Brauer, 'Monographie der Oestiden' (Vienna 1863); Osborn, 'Insects Affecting Domestic Animals.'

Botallack, a mine on the west coast of Cornwall, England, eight miles north of Land's End. The works are on the edge of the cliff; part of the underground workings (abandoned in 1875) extended 2,448 feet beneath the sea. The mine has been wrought for both tin and copper.

Botanical Gardens. The term botanical garden is used to designate a limited area of ground on which is grown a collection of plants including a large number of species brought together to subserve scientific, educational, æsthetic, or economic purposes. In the broadest sense, it is a museum of plants, and one of its chief ends is to represent, by means of living specimens so far as possible, the principal types of vegetation of the earth. It is impossible to cultivate more than a few thousand species on any given area under the natural conditions of soil and climate, and the open-air plantations are generally supplemented by collections grown under shelter, in glass houses, and in specially prepared soils. It has been found practicable to grow in this manner as many as 12,000 or 15,000 species of the higher plants in the botanical gardens at St. Louis and New York, at Kew, England, and at Berlin, Germany. A

BOTANICAL GARDENS

proper selection of this number may be made to represent somewhat fairly the principal forms of plants, which include about 250,000 species. That is to say, it is possible to grow in one place about one species out of every 17 in existence.

Living plants cultivated in the open air are most suitably arranged in plantations according to their general habit, and in such manner as to show their general relationships. Then special groups are often made of certain families, such as the conifers, the willows and poplars, the grasses, ferns, or mosses. The most common arrangement of plantations includes the herbaceous grounds, the aquatic plants, alpinum, viticetum, fruticetum, arboretum, and economic plantations. Some institutions bring together collections for the purpose of illustrating the local flora, or the flora of any given geographical district.

The herbaceous plantations are intended to include the representatives of small soft-bodied plants which die down to the soil during the winter or resting season, and which may or may not have a perennial underground stem-formation of some kind. Many of the species are annuals and must be grown from seeds every year.

The pools for aquatic plants are arranged to afford suitable means for the culture of forms which float or root in ponds and streams of fresh water, and include a wide variety, such as the water-lily, pondweeds, *Philotria*, water-hyacinth, etc.

An alpinum is a special plantation generally arranged to afford means of cultivation of species from cold climates on mountain-tops or in higher latitudes. Plantations of this kind are often termed rockeries, and are in the form of a ridge or hill covered with boulders. In such plantations precautions must be taken to give lime-loving plants a place among limestone rocks, and with the necessary low temperatures.

The viticetum is a plantation devoted to the cultivation of climbing and trailing vines, and may take almost any form demanded by the exigencies of practical gardening. Among the necessary features are trellises or supports for twining and tendril climbing forms.

The fruticetum includes all woody perennial plants which do not form a central trunk six feet in height, and which are therefore not trees. These are most effectively grouped when the individuals of the separate species are placed in the ground separately in a scheme of general arrangement by which every plant may be inspected from all sides and is unshaded by its neighbors.

The arboretum includes trees, and these may be variously arranged, singly or in groups, always with respect to their mutual relationships. On account of their great size and comparatively slow growth and greater permanency, the placing of trees in any given landscape scheme in a garden is attended to with the greatest care.

The economic plantations may include useful plants arranged according to their relationships, and grouped according to the use or nature of the derivative. Thus a division may be made in which only species used for medicine, foods, or clothing are included, or a division may be made to include plants which yield starches, oils, gums, and resins.

Special plantations of selected families must

depend for their constituency upon the location of the garden. Thus it would be possible to form a collection of palms in a tropical garden, and one of pines or willows in a temperate climate. Geographical plantations may take any given district by variously arranged plantations.

Still another group of plantations is being made in some gardens to illustrate types of habit and structure. Some of the principal groups to be illustrated in this manner are parasites, which draw nourishment from the living bodies of other organs; saprophytes, which live on decaying organic matter; xerophytes, plants adapted to living under the driest conditions; plants with structures serving as a protection against animals. Forms of propagation and reproduction, methods of dissemination of spores and seeds, etc., also serve as subjects to be illustrated by separate groups.

The collections grown under shelter and in conservatories are generally grouped in such manner that species are partly assembled with regard to their climatic requirements, and partly according to their relationships. Thus a house may be devoted to tropical plants, or to temperate plants, or may contain only orchids, palms, ferns, cacti or succulents, or other special groups.

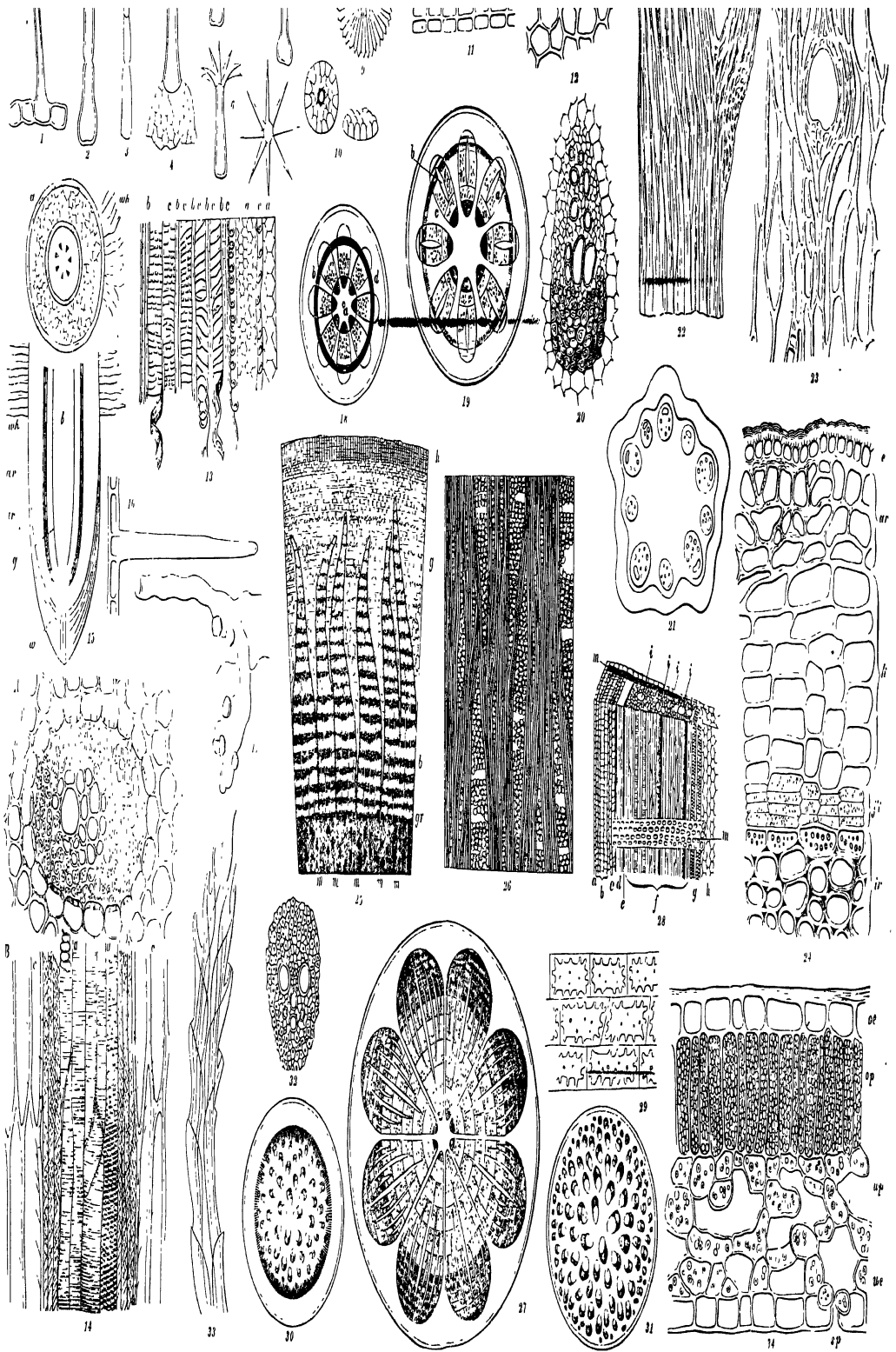
The part of the vegetable kingdom which may not be cultivated may be represented in a museum by dried specimens, material in preserving-fluids, and dissections of various kinds. Here again the arrangement may be upon the basis of natural relationship, or upon the basis of economic usefulness. The species which formed the vegetation of the previous geological periods are represented by fossil specimens, completing the history of the plant-world so far as it is known, and yielding suggestions as to the descent of the present types.

Two general educational purposes are served by an institution of this character. Its collections are arranged to present information on the form, relationship, mode of life, habit, and general biological character of the principal types of vegetation, in such manner as to be capable of comprehension by persons unacquainted with the technical aspects of the subject. Further interpretation of such facts may be made by means of books, journals, lectures, etc., devoted to this branch of work and study.

The material accumulated for the exploitation of popular knowledge of plants also affords an excellent basis for the induction of students into the more strictly scientific aspects of botany; and when such material is supplemented by laboratories furnished with apparatus, microscopes, and other instruments of precision, the activities of these students may be carried beyond the frontiers of the subject into the investigation and discovery of new facts and phenomena. This extension of the boundaries of knowledge concerning the plant-world may be carried on to advantage only when a library is at hand containing all of the more important literature bearing upon the subject.

Botanical gardens owe their origin to the needs of medical science, in accordance with which species showing valuable medical properties were grown in convenient places.

The first authentic record of the introduction of medicinal plants into cultivated plots of ground dates no farther back than the time of



Figs 1-33 Epidermal Appendages 12, 13 Outer Bark of Birch. 12 Longitudinal section of vascular bundle in the Balsam. 14 Cross and longitudinal sections of vascular tissue in a Fern. 16 Do of young Alder root. 18, 19 Root hairs. 20, 21 Ideal cross section of a Dicotyledonous stem. 22 Cross section of a vascular bundle in do. 23 Cross section of stem of Clematis. 24, 25 Network of Vessels from stem of Son thistle. 26 Cross section of Black Currant bark. 27, 28 Cross and longitudinal sections of Lilac in Lime tree. 29 Ideal section of a Dicotyledonous stem. 30 Ideal structure of Exogenous stem. 31, 32 Medullary ray of oak. 33, 34 Ideal cross section of Endogenous stem. 35 Cross section of a Monocotyledonous vascular bundle. 36 Longitudinal section of Root stock of Lys. 37 Vertical section of Beech leaf.

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the elder Pliny (23-79 A. D.), who writes of the garden Antonius Castor, at Rome, in which were grown a large number of medicinal plants. This step, however, may have been taken much earlier by the Greeks, Chinese, or Mexicans. Later the Benedictine monks of northern Italy paid great attention to the growing of remedial herbs, and devoted an important proportion of the monastery gardens to this purpose. This practice was also carried beyond the Alps, and in 1020 a garden was in existence at the monastery of St. Gall, in Switzerland, not far from Lake Constance, which contained 16 plots occupied by medicinal plants. A garden of this character was founded 1309 at Salerno, and another at Venice 1330.

The 16th and 17th centuries witnessed the foundation of many gardens in England, France, Germany, Holland, and Sweden, some of which have had a continuous existence to this day. The garden of Bologna was founded 1568; Leyden, 1577; Leipsic, 1579; Montpellier, 1596; Paris, 1597. The last-named was organized for the determination of "what variations were possible in the style of bouquets worn at the royal courts." Then followed the establishment of the gardens at Giessen, 1605; Strasburg, 1620; Jena, 1629; Oxford, 1632; Upsala, 1667; Chelsea, 1680.

The number of these institutions at the present time is nearly 300, only a few of which, however, are devoted to the more important purposes named above. Many botanical gardens are merely municipal parks in which some attempt is made to exhibit special groups of plants, and are devoted chiefly to floriculture. Others are almost entirely experiment stations for the exhibition and testing of economic species, while still others find their chief usefulness as an aid in teaching botany in schools and colleges.

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Botanical Geography. See DISTRIBUTION OF PLANTS.

Botany is that branch of biology, or the science of living organisms, which deals with plants, and is thus distinguished from zoology, which deals with animals. An individual plant, considered as a living or once living organism, may be studied in two ways—with reference to its structure or with reference to its functions. These represent the two great subdivisions of pure botanical science—*anatomy* and *physiology* respectively. All other phases of botanical science are special developments of one of these two, either alone or in combination with the other, or in relation additionally to some other branch of knowledge. *Anatomy* and *physiology* are thus the primary elements, as it were, of botany, which in varying combinations with each other and with the elements of other sciences constitute the branches of botanical science actually in existence, such as *taxonomy*, *ecology*, *cytology*, and *pathology*. The term *plant anatomy* is restricted frequently in actual use to *gross anatomy* and is often called *structural botany*. In this sense is covered about as much of the whole of anatomy as can be studied by the unaided eye or with a lens. *Minute anatomy*, or *histology*, covers the minute structure of plants,

the principal instrument in its study being the compound microscope. A study of the relationships of plants on the basis of anatomical resemblances constitutes comparative anatomy, or morphology. The classification of plants, known as *taxonomy* or *systematic botany*, is in the main a specialized branch of morphology, for the principal means by which plants may be grouped so as to indicate their genetic relationship is a comparison of their structural differences and resemblances. In its actual study *plant physiology* is closely associated with *plant histology* because most of the functions of the plant are intimately connected with the structure of plant cells, and the physiologist must of necessity understand these structures. A special branch of botanical research which has to do with the complex structure and activities of the plant cell is known as *plant cytology*. The study of the diseases of plants, whether they are due to fungi or other plant organisms, or are purely physiological, is *plant pathology*, sometimes called *vegetable pathology*.

History.—Among the ancients, Aristotle the Greek philosopher (384 to 322 B.C.), Theophrastus his pupil (about 372 to 287 B.C.), the Roman naturalist Pliny the Elder (23 to 79 A.D.), and the Greek physician Dioscorides (of the 1st or 2d century A.D.) left botanical records of historical interest, but botany as a modern science has developed in the last four centuries, dating from the Reformation. The writing, particularly by the Germans, of herbals, or treatises on economic and medicinal plants, and the founding of botanical gardens, occupied most of the 16th century, but in the year 1583 Cesalpino, an Italian physician, published the first formal and comprehensive classification of plants. This, though artificial, formed the basis of all generally recognized classification to and including the time of Linnæus in the latter part of the 18th century. The 17th century was chiefly notable for advances not in the classification of plants, but in their structure and vital processes. Malpighi, an Italian, and Grew, an Englishman, almost simultaneously published their researches on the gross anatomy and the cellular structure of plants, the first of which were presented in 1671. To the work of these men in plant anatomy little of importance was added in more than a hundred years. The other important discovery of the century was the demonstration by Camerarius in 1691, through direct experiment, of the sexuality of plants. The 18th century was marked especially by advances in classification. In the year 1700 Tournefort published his 'Institutiones,' in which for the first time genera were systematically named and described. During this century Linnæus, the great botanical compiler and systematizer, brought out his successive works, culminating in the 'Species Plantarum,' in 1753. It was later in the same century, too, that botanical exploration came to be recognized as an important department of the voyages of geographic and scientific discovery in which the nations of Europe became engaged. In 1789 A. L. de Jussieu published his 'Genera Plantarum,' in which was first systematically formulated a comprehensive classification of plants according to their natural relationship, as opposed to the artificial systems followed by Cesalpino and Linnæus. In the last two decades of this century were laid the foundations of our present know-

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ledge of the important part played by the air in the nutrition of plants, a proper conception of which was possible only in the light of the new developments which took place at that time in chemistry. The 19th century witnessed enormous strides in plant anatomy and plant physiology, the latter largely contributed to by workers in chemistry and physics, and the former rendered possible by improvements of the compound microscope and accessory instruments, especially those which came into general use about 1840. From this movement has been derived most of our knowledge of the life history and relationship of the lower groups of plants, the fungi, algæ, and lichens, and the assignment of the pines and their relatives to their true position next above the ferns. The whole realm of botanical research was profoundly affected by the work of Darwin, beginning with the publication of his 'Descent of Man,' in 1858, which gave a new point of view for all subsequent work. In systematic botany the principle of the development of species from a common ancestor was substituted for the old view of the constancy of species. The remarkable adaptations for cross fertilization in the coloration, odor, and structure of flowers was given its true and significant explanation as a means for originating and perpetuating species. Darwin's work gave a new philosophical basis for the interpretation of observed phenomena and facts.

Progress in the United States.—At the beginning of the 19th century the advancement of botany in North America was largely in the hands of physicians, through their requirement of a knowledge of plants as *materia medica*. Professors of botany were unknown. Linnæus and other great botanists in Europe had had American correspondents, and geographic expeditions accompanied by European botanical collectors had touched the margins of the continent. Some botanical exploration, chiefly by European visitors, had been effected east of the Alleghany Mountains. The centre of botanical activity was at Philadelphia, among the members of the American Philosophical Society. With Lewis and Clark's expedition across the continent to the mouth of the Columbia, in 1803-6, began a series of American explorations of the great interior, directed first to the Louisiana Purchase, then to Oregon, and finally to California. These were supplemented on the north by the British expeditions of Sir John Franklin and others in quest of a Northwest Passage. In the fifties began the Pacific Railroad surveys and these were followed by the geological surveys. All these contributed materials for the discovery, description, and orderly arrangement of the North American flora, the collections going largely into the hands of Thomas Nuttall at Harvard University, John Torrey at Columbia, Asa Gray, who was Nuttall's successor, and George Engelmann, a physician of St. Louis. Meanwhile appeared a new factor which was destined to play an important part in the development of botanical science in America, the establishment of agricultural colleges in the late sixties. These institutions created a demand for a class of botanists who did not exist in the United States or anywhere else, botanists who had brought a critical scientific training to bear on the hard problems of agriculture. For the succeeding two decades the universities of the country, including some of the agricultural colleges them-

selves, were busily engaged in educating the required men, a movement which resulted in the preparation of many who were competent not only to act as teachers of botany in the agricultural colleges but, a still more important matter, to act as investigators in agricultural experiment stations, one of which was established in each of the States and Territories in the late eighties. The branch of botany which received its greatest impulse was pathology, the science of the diseases of plants. Plant pathology has already been carried to a point of high scientific development and practical application attained in no other country. Systematic, or, as it is now more commonly known, taxonomic, botany has made rapid strides forward in the past two decades, largely through the application of methods developed and perfected by American ornithologists. These methods differ from others chiefly in a full consideration of the geographic relationships of plants and the examination of very large series of specimens. A new revision of the whole North American flora along these lines and accompanied by systematic botanical exploration is now under way. For the future two lines of inquiry are likely to be conspicuous in American botany, first, the principles of heredity in plants and the applied phase of the subject, plant breeding on a scientific basis; and second, the correlation of plant functions with plant structures, a work which will have far-reaching importance in broadening our understanding of the processes of nature. The geographic location of American botanical research has undergone a profound change as a result of the Spanish-American war. The area to which up to that time the energies of American botanists had been chiefly directed was the north temperate belt of one hemisphere, but they now must deal in addition with botanical problems in the tropics of both the New World and the Old World.

Classification.—The plant kingdom is divisible into five great groups, the *Myxophyta*, or slime molds; the *Thallophyta*, including the bacteria, algæ, fungi, and lichens; the *Bryophyta*, including the liverworts and mosses; the *Pteridophyta*, including the ferns and their allies; and the *Spermatophyta*, or flowering plants. The first four of these are often jointly designated as the *Cryptogamæ*, or cryptogams, in contradistinction to the *Phanerogamæ*, an older name for the flowering plants.

The *Myxophyta*, or slime molds, known also as the *Myxomycetes*, *Mycetozoa*, and *Myxothallophyta*, are organisms which though usually treated as belonging to the vegetable rather than the animal kingdom, have no cellulose walls covering the cells of which they are composed; pass a part of their life as plasmodia, or masses of naked creeping protoplasm similar to the animals known as amœbæ; and are reproduced without even the simplest method of sexual regeneration. Most of them resemble fungi in that they grow upon decayed animal or vegetable matter. The *Thallophyta* include a wide variety of plants, associated with each other by exclusion, on the one hand, from the animal-like *Myxophyta*, and, on the other, from the *Bryophyta* and higher plants. The plant body is commonly not differentiated into stem and leaf, and may even be unicellular; a cell wall is usually present; chlorophyll is often wanting; and frequently sexual reproduction does not ex-

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An Alaskan Valley, Covered with Arctic Vegetation (upper).

Spruce Forest of Interior Alaska, Representing the Boreal Zone (lower).

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ist. Among the important groups belonging to the *Thallophyta* are the *Schizomycetes*, or bacteria; the *Schizophyceæ*, or bluegreen algæ; the *Euphyceæ*, or true algæ, including the diatoms, desmids, green algæ, stoneworts, brown algæ, and red algæ; the *Eumycetes*, or true fungi; and the *Lichenes*, or lichens. The *Bryophyta*, or liverworts and mosses, are small plants, having in their life cycle a sexual generation in which the sexual organs are borne on a plant body usually differentiated into stem and leaves, followed by a non-sexual generation, which consists of a stalked or sometimes sessile spore-bearing capsule remaining attached to the plant body of the preceding generation. The female organ of reproduction consists of an oosphere in a sac called an archegonium, the walls of which are made up of many cells, much more complex structurally than the female organ of the *Thallophyta*. The male organ consists of motile antherozoids produced from an antheridium. The group consists of the *Hepaticæ*, or liverworts, some of which have a flat scale-like body called a thallus, and of the *Musci*, or mosses. The *Pteridophyta*, represented by the ferns, resemble the *Bryophyta* in their sexual organs, but differ in the possession of what is known as vascular, as opposed to merely cellular, tissues, and also in that the asexual generation becomes a large plant and maintains a separate existence independent of the earlier generation. The group includes, besides the true ferns, the grape-ferns, jointrushes, clubmosses, quillworts, and a few others. The *Spermatophyta*, or flowering plants, also known as *Anthophyta* or *Phanerogama*, find their essential difference from the *Pteridophyta*, not in the production of flowers, but in the relationship of the sexual and the asexual generations and in the character of the sexual organs and their embryonic product. In an ordinary fern the sexual generation is a small flat green organism, resembling a thallose liverwort, growing on the ground or other substratum and deriving its nourishment from it, but in the *Spermatophyta* the sexual generation is reduced to almost microscopic dimensions, and leads no independent existence but is enclosed within the body of the non-sexual generation, the male portion consisting of the pollen grain and the tube that grows out of it when the pollen grain germinates, the female portion consisting of a minute cellular structure within the embryo sac of the ovule. It is to be noted that no motile bodies are produced, as in the two preceding groups, and that the fertilization of the ovule results in the development of an embryonic plant called a seed, which is produced by none of the lower groups of plants. The *Spermatophyta* are divided into two groups, of which the lower is the *Gymnospermæ*, including the cycads, the cone-bearing trees, and a few related families. In these the ovules are borne not in ovaries but naked among the floral bracts, and the sexual generation of the female is still comparatively complex before fertilization and bears considerable resemblance to that of some *Pteridophyta*. In the other group, the *Angiospermæ*, the ovules are borne in ovaries, and only the simplest remnant of a sexual generation persists. In this group are the *Monocotyledones*, including the grasses, palms, lilies, orchids and their relatives, and the *Dicotyledones*, including the great majority of flower-

ing plants. The dicotyledonous and the gymnospermous plants were at one time classed as a group *Exogena*, in contradistinction to the group *Endogena*, which consisted of the monocotyledonous plants. This grouping of the flowering plants into exogens and endogens, however, is no longer maintained, it having been shown from embryological studies that the gymnosperms should stand next above the ferns. The old division of dicotyledonous plants into *Apetalæ*, *Gamopetalæ*, and *Polypetalæ* is also now discarded, the families included under *Apetalæ* appearing not to constitute a real group. They have therefore been interpolated among the families of the remaining two groups, most of them going with the *Polypetalæ*. All three of the old names have been abandoned, the name *Archichlamydeæ* being now used for the apetalous and polypetalous plants jointly, and the name *Sympetalæ* for the gamopetalous plants. The known species of plants as based on recent standard and conservative enumerations of the various large groups are approximately as follows:

<i>Myxophyta</i>	400
<i>Thallophyta</i>	59,000
<i>Bryophyta</i>	8,000
<i>Pteridophyta</i>	3,500
<i>Spermatophyta</i>	120,000
	<hr/>
	190,900

Plants in Relation to Geology.—Plants play an important part in the configuration of the earth's surface by the prevention or retardation of erosion. This is accomplished by the direct binding action of roots on the soil, by obstructing the run-off of water as it filters through a layer of decaying vegetable matter, and by hindering the melting of snow under the shade of a forest cover. Wind erosion of sand or dust soils both on beaches and in arid regions is prevented chiefly by vegetation. In the building up of peat deposits, such as the sphagnum bogs of the Northern States, or the Dismal Swamp, Okefinokee Swamp, or the Everglades, plants are the principal factors. Deposits of coal and petroleum are of vegetable origin. The disintegration of rocks is hastened by the presence of living mosses and other plants. The fertility of soils is largely dependent on the admixture of decayed vegetable matter, or humus; and the so-called nitrifying organisms of the soil, which change nitrates, which can not be taken up as food by plants, to nitrites, which are readily absorbed, belong to a group of microscopic plants known as bacteria. A very important role in soil fertilization is played by a certain group of plants, the *Leguminosæ*, including the clovers, beans, and peas. One of the essentials of plant food is nitrogen. Ordinary plants have not the power to take free nitrogen from the air, where it exists in almost unlimited quantities, but absorb their nitrogen from certain nitrogenous substances in the soil. This element of soil fertility is soon exhausted. Leguminous plants, however, produce on their roots small tubercles containing bacteria which have the power to take free nitrogen from the air in the soil and put it into a form suitable for plant food. By the death and rotting of the plant the nitrogen thus absorbed from the air is incorporated in the soil and is available as food

for all sorts of vegetation. In this way the leguminous plants are almost indispensable for the rehabilitation of soils worn out by excessive cropping.

Plants in Relation to Geography.—Most of the land surface of the earth is covered by a green mantle of vegetation, which varies in its makeup at different points in accordance with several factors, the most general of which in its variation is temperature. Certain areas of the north polar and south polar regions, permanently or almost permanently covered with snow or ice, and various similarly cold areas on mountains of higher and higher elevation in lower latitudes, are devoid of vegetation. Next to this is an area of sufficient warmth in summer to produce a vegetation of herbaceous plants and shrubs but devoid of trees—the arctic, antarctic, and alpine vegetation. Then come the temperate areas of the earth, characterized by a vegetative covering able to withstand freezing during a portion of the year, yet sufficiently warm to permit an abundant growth of trees. Next follows the tropical area, with a vegetation not subjected to frost and characterized especially by forests made up in part of palms. A factor of probably even greater importance, but more broken and restricted in its distribution, is moisture. The four great temperature categories outlined above are cross-hatched by moisture lines parallel with the lines of equal precipitation. With too little moisture forests can not exist, and we have plains and deserts of grass or brush. Neither do forests exist in a soil too persistently moist and poorly drained, and thus we have moors, bogs, natural meadows, and savannas. The extreme of moisture is reached in the plants called aquatics, growing either in fresh water or in the ocean, often wholly submerged.

Each of the other factors in plant growth, light, air, food, and the complex mechanical relations of the plant, varies greatly from one locality to another, and in their various combinations with different degrees of heat and moisture they furnish an almost endless variety of environments. Each of these combinations of conditions has its characteristic association of plants, which, adapted to the conditions, and to each other, form a community. The study of plants in their detailed relation to these local surroundings forms a branch of geographic botany known as plant ecology. North America furnishes a good series of geographic areas with sufficient climatic differences to necessitate different floras. The vegetation of the continent is divided by Merriam into the following zones: Arctic, Boreal, Transition, Upper Austral, Lower Austral, Tropical. The Arctic zone extends from northern Labrador northwestward across the northern edge of the continent to Bering Strait, dipping southward along the shores of Bering Sea to Bristol Bay, Alaska. The vegetation of this zone consists of herbaceous or of depressed woody plants, trees being absent. Over large areas, known as tundra, the ground is permanently frozen underneath, a few inches of the surface thawing each summer and permitting the growth, in a cold, wet soil, of an often luxuriant but low vegetation. The Arctic zone is represented southward as far as southern California and northern Arizona by certain alpine plants on the summits of mountains high enough to have a timber line, approximately 12,000 feet in that latitude. The Boreal zone, sometimes

subdivided into a northern, or Hudsonian, belt and a more southerly, or Canadian, belt, extends from the Arctic zone southward to a line traversing the northern part of New England, Ontario, Michigan, and Minnesota, jumping to the higher elevations of the Adirondack and Appalachian Mountain systems, then continuing westward across North Dakota and Assiniboia to British Columbia, dipping south in the higher elevations of the Rocky Mountains nearly to Mexico, in the Cascades and Sierra Nevada to southern California, and along the shores of the Pacific to northern California. The most characteristic feature of this zone is forests of spruce or balsam fir. The Transition zone covers most of New England, New York, Michigan, Minnesota, North Dakota, about half of South Dakota, and the southern part of Assiniboia, thence extending southward through the Plateau and Great Basin to Arizona, New Mexico, and California, in the southern parts of those States reaching down to an elevation of about 6,000 feet. The most characteristic tree of the eastern, humid part of this zone is the white pine; of the western, arid part, the yellow pine. The Upper Austral zone, as represented in the eastern United States by the so-called Carolinian flora, covers the lower Hudson valley, southern New Jersey, Delaware, eastern Maryland, the Piedmont section of the south Atlantic States, middle Tennessee and Kentucky, and most of Ohio, Indiana, Illinois, Iowa, and Missouri, northwestern Arkansas, southeastern South Dakota, and eastern Nebraska and Kansas. It is especially characterized by its forests of certain species of oak and hickory. The flora of the western part of this zone, known as the Upper Sonoran, covers the principal part of the arid western plains, from Washington and Montana southward through the Mexican plateau. The flora is devoid of trees and is commonly characterized by sagebrush or bunchgrass. The Lower Austral zone is divided, like the last, into an eastern humid and a western arid part. The eastern, containing the Austroriparian flora, covers the coastal plain from Chesapeake Bay to middle Texas, extending northward in the Mississippi valley to extreme southern Illinois and Indiana. One of the most characteristic wild plants is the cane, while cotton is the most conspicuous cultivated plant. In the arid region of western Texas, the great valleys of New Mexico, and the deserts of southwestern Arizona, southern Nevada, and southeastern California, lies the western part of the Lower Austral zone, containing the flora known as the Lower Sonoran, characterized especially by the creosote bush and the mesquite. This flora has large extensions into northern Mexico. The Tropical zone covers the lower third of the Florida peninsula, enters the extreme southern point of Texas, and on the Pacific coast reaches north on the east side of the Gulf of California to the lower Colorado and Gila rivers. From these northern extremes the tropical flora extends southward through Mexico, Central America, and the West Indies. Various genera and species of palms form the most conspicuous and characteristic features of this flora.

Plants in Their Economic Relation to Man.—Every savage race is intimately associated with the flora of its region. Having no means by which to supply the ordinary necessities of life through foreign trade, as do many civilized

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1. Samuela, and Vegetation of Western Texas.
 2. Yellow Pine Forest of Oregon.

3. Agave, and Vegetation of Western Texas.
 4. Tree Fern, and Vegetation of the Tropical Zone.

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races, the savage has learned from necessity to know the precise qualities of the plants about him as foods, textiles, poisons, dyes, tans, fuels, etc. In connection with the making of a single aboriginal instrument, such as a bow or a fire-drill and block, there is required on the part of the savage a knowledge of the strength, elasticity, texture, and other qualities of all the kinds of wood occurring in the range of his travels, such as is not possessed by one person in a thousand among highly civilized races. The economic value of a correct and discriminating record of the uses of plants among aboriginal peoples is evident. The influence of a familiar flora in attracting a savage race to a wider geographic range or that of a strange flora in limiting migration in any direction is a natural outcome of the savage's exact knowledge of the plants of his native region. The practice of some of the migratory races of prehistoric man to transport their cultivated plants with them has resulted in the wide extension of these plants from the regions they naturally occupied. From this association it turns out that a critical study of the origin and distribution of the plants cultivated by aboriginal races throws important light on their prehistoric migrations. Some of these botanical facts appear to be of very great antiquity, perhaps even antedating those furnished by aboriginal arts or by language. This study of the relation of primitive man to his plant environment is called *ethnobotany*, or *aboriginal botany*. Some of the processes of plant life are important to man as being fundamental to his existence. The plant is an engine which through the energy furnished by sunlight is capable of transforming inorganic substances into organic compounds, without which animal life could not exist. The ordinary economic relations of plants to civilized man are many, and enter as important factors into such arts and industries as agriculture, horticulture, medicine, manufacture, and commerce. The production and elaboration of plant products and their transportation from those parts of the world in which they can be and are produced to other parts in which they are needed occupies probably the largest part of the energies of the human race.

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Botany Bay, New South Wales, Australia, so called by Capt. Cook on account of the many strange plants found growing here. Cook landed in Botany Bay on his first voyage in 1770, and took possession of the country in the name of his sovereign. The penal settlement, founded in 1788, and popularly known by the name of Botany Bay, was established on Port Jackson, where the town of Sydney now stands.

Botany Bay Gum, a gum resin produced by the *Xanthorrhæa hastilis*, or *resinifera*, of Australia.

Botargo, a relish made of the salted roe of the mullet or tunny, used on the Mediterranean coasts.

Botetourt, Norborne Berkeley, a conspicuous actor in American colonial history: b. England, 1734 (?); d. Williamsburg, Va., 15 Oct. 1770. He was the descendant of John Berkeley, the cavalier, who was ennobled by Charles II. in 1660. He was sent to Virginia as royal governor in 1768, just eight years before the Declaration of Independence. He had full instructions from the Crown and directions to assume more dignity than had been the wont of colonial governors, and accordingly he paraded the streets of Williamsburg with guards, a coach, and other requisites of vice-regal pomp. Conflicting duties to the king and the people made his situation most unpleasant. In 1769 the assembly took into consideration the incipient troubles with England, and on 16 May passed firm but respectful resolutions remonstrating against parliamentary taxation and the right claimed to send them to England for trial. So firm were they that Lord Botetourt summoned the speaker and burgesses before him and dissolved them. The result was that a convention met in a private house and took the incipient steps for the revolution. The convention did not attempt to legislate, but simply remonstrated with Parliament, sending its resolutions to the other colonies and to England. Under the influence of these resolutions Lord Hillsborough wrote a letter to Lord Botetourt, assuring him that it was not the intention of government to tax the colonies, and that the obnoxious imposts would be withdrawn, which letter Lord Botetourt communicated to the assembly. All these anticipations, however, were destroyed by the policy of Lord North, who succeeded Charles Townsend, and the promise was not fulfilled in full, the duty on tea being retained. Botetourt was deeply mortified, and soon died of disease aggravated by mental suffering. He was deplored by men of all classes in the colony, and the legislature erected a marble statue to his memory, which is still standing in the college of William and Mary.

Both, John and Andrew, two Flemish painters, were born at Utrecht about the year 1610, Andrew being the younger. They were the sons of a glass painter, who instructed them in the rudiments of drawing. They afterward made further progress in the school of Abraham Bloemaert, and went at an early age together to France and Italy. John, attracted by the works of Claude Lorraine, chose him for his model; Andrew preferred the painting of the human figure, and imitated the style of Bamboccio. But although their inclinations led them in different directions, their fraternal affection often united their talents in the same works. Thus Andrew painted the figures in the landscapes of his brother; and their labors harmonized so well, that their pictures could not be suspected of coming from different hands. The ease and fine coloring in the beautiful figures of John cannot be overlooked in spite of the excess of yellow sometimes found in them. Andrew was drowned at Venice in 1650. John, inconsolable for his loss, abandoned Italy, and returned to Utrecht, where he died shortly after.

Botha, Christian, Boer commander: b. the Transvaal; d. Kokstad, Griqualand West, 8

Oct. 1902. At the opening of the Boer war in 1899 he led a commando into Natal and was active in the siege of Ladysmith and at the defense of the Tugela crossing. After the relief of Ladysmith, he retreated to Laing's Neck, where he was left by his brother, Louis Botha, in command of the Boer forces. By opening negotiations with Gen. Buller he delayed that general's advance for several days, and after the fall of Pretoria he was placed in command of all the Boer forces in the southeastern Transvaal. His frequent raids into Zululand effected the diversion that allowed Gens. Louis Botha and De Wet to continue the war.

Botha, Louis, Boer soldier: b. Greytown, Natal, about 1864. He began life as a farmer, and, as a young man, had a share in the establishment of the Transvaal Republic. Later he fought in the Kaffir campaign. He was elected to the Volksraad at Pretoria. Upon the outbreak of the Boer war with England in 1899 he was given a subordinate command, and upon the death of Gen. Joubert in March 1900 he became commander-in-chief of the Boer forces. He demonstrated great capacity by his victories at Spion Kop and Colenso.

Bothie (Gael. *bothag*, a cot), a house, usually of one room, for the accommodation of a number of work people engaged in the same employment; especially, a house of this kind in parts of Scotland, in which a number of unmarried male or female farm servants or laborers are lodged in connection with a farm. Bothies are most common in the northeast of Scotland, and are chiefly for the accommodation of unmarried male farm servants engaged on the larger farms, who as a rule have to do their cooking and keep the bothie in order for themselves. The bothie system has often been condemned.

Bothnia, the name formerly given to a country of northern Europe, extending along the east and west shores of the Gulf of Bothnia, the east portion now being comprised in Finland, and the west in Sweden.

Bothnia, Gulf of, the northern part of the Baltic Sea, which separates Sweden from Finland. It commences at the island of Aland, lat. 60° N., and extends to 66°; its length is about 450 miles, its breadth from 90 to 130, and its depth usually from 20 to 50 fathoms. As its water contains little salt, it freezes over in the winter, so as to be passed by sledges and carriages. It abounds in salmon and other fish, and also in seals.

Bothriocephalus, a genus of cestoid worms which is found very abundantly in the intestines of predaceous fishes, and one species of which is sometimes found in the intestinal canal of man. It belongs to the same family as the tapeworm (*Tania solium*), but it is distinguished from it by having its segments broader than they are long; by wanting the four disks which surround the head of the tapeworm, and having in their place two lateral longitudinal openings; and thirdly, by having the sexual organs on one of the flat surfaces of each segment instead of at the edges of the segments. The two longitudinal openings (whence the worm receives its name, from *bothrion*, a little pit, and *kephalē*, the head) do not seem to be organs of nutrition, but merely a kind of suckers by which

the worm is enabled to attach itself to the intestines of the animal which it infests, while it is nourished by absorption throughout its whole length. Although, as already stated, this worm generally infests the bodies of predaceous fishes, it is capable of being transmitted to all vertebrate animals, and especially it is found in those birds which live upon fish. The only species which is found in the intestines of man is the *Bothriocephalus latus*, and it is rare to find even this species except among the inhabitants of two distinct parts of Europe, the north and the centre. It is found, on the one hand, in Russia, in Norway, and in Sweden, and on the other hand, in Switzerland, the north of Italy, some provinces of Germany, and some departments of France, but rarely elsewhere. It has been remarked that this worm is common where the *Tania* or true tapeworm is rare, and *vice versa*. It is rare in the United States, but with the increase of emigration from the regions of Europe, where it abounds, its appearance may be looked for.

Bothwell, James Hepburn, Earl of, is known in Scottish history by his marriage to Queen Mary. He was the only son of the third earl: b. about 1536; d. 1578. He succeeded his father in 1556, thus obtaining important offices and estates, and by 1566 he had attained to high favor with the queen. The plot by which Darnley lost his life in 1567 was of his contrivance, and the queen was suspected of conniving at it. Bothwell was charged with the crime and underwent a mock trial, being of course acquitted. After the death of Darnley he seized the queen near Edinburgh, and carrying her a prisoner to Dunbar Castle, prevailed upon her to marry him. Before this he had divorced his own wife, Jean Gordon, sister of the Earl of Huntly. Though seemingly secure in the possession of power, and though created Duke of Orkney by the unfortunate queen, he soon found that his conduct had roused the indignation of the kingdom. A confederacy was formed against him by the barons, the queen was liberated from his power, and he escaped to the Orkneys, and afterward to Norway. The Danish authorities kept him imprisoned for some time at Malmo, latterly at Drangholm in Zealand, where he died insane. See the various histories of Scotland, and the 'Life of Bothwell' by Prof. Schiern (English translation 1880).

Bothwell, Scotland, a village of Lanarkshire, on the north bank of the Clyde. It is situated eight miles east of Glasgow, and about one mile beyond it stands Bothwell bridge, where a decisive battle was fought in 1679 between the Scottish Covenanters, commanded principally by their clergy, and the royal forces, commanded by the Duke of Monmouth, in which the former were totally routed. Near the village are the fine ruins of Bothwell Castle, once a stronghold of the Douglases.

Botoccos, or **Aymores**, a Brazilian race of Indians. They live 70 to 90 miles from the Atlantic, in the virgin forests of the coast range (Serra do Mar or Serra dos Aymores), on the borders of the forests of Minas-Geraes and Espirito-Santo, especially on the Rio Doce. They receive their name from the custom which they have of cutting a slit in their under lip and in the lobes of their ears, and inserting in these, by way of ornament, pieces of wood shaped like

the bung of a barrel (Portuguese *botoque*). They have oblique eyes and projecting cheekbones. Their color is a dirty brown. They go quite naked, and paint their bodies, and a Botocudo warrior with his lip and ear plugs, his body painted black and red, and his face bright red, strongly reminds one of a denizen of the infernal regions. They are very skilful with the bow and arrow, and live chiefly by hunting. They now number only a few thousands, and are decreasing.

Botrychium, a genus of fern (adder's-tongue), of the sub-order *Osmundæ* and tribe *Ophioglossæ*, characterized by its distinct *theca* in a compound spike attached to a pinnate or bipinnate frond. The common American species are: *B. lunaria*, common moonwort, which grows on elevated lands and pastures where other ferns are seldom found. It was once supposed to possess great virtues, both magical and medicinal, and was carefully gathered by the light of the moon. *B. virginicum*, the largest of the species, is known by the name of rattlesnake fern, from growing in places frequented by that dangerous reptile.

Botrytis, a genus of fungi belonging to the section Hypomycetes, and familiar by name to cultivators from its connection with the potato disease. The genus contains a number of those minute plants known as molds and mildews, and of these some have the peculiar habit of growing in the tissues of living vegetables. The threads of which their growth consists creep among the loose cells of the under side of leaves, and send up their fertile shoots through the stomata. Many kinds of *Botrytis* are extremely destructive to various plants. Whole crops of onions are soon destroyed by one species; legumes suffer from another, but in a less degree; and a third species is sometimes injurious to turnips. The decay of the leaves and stem in the potato disease is now charged against *Phytophthora infestans*, but old writers attributed the trouble to *B. infestans*. Though extremely injurious to the farmer these molds are sometimes very serviceable by destroying weeds. Various agricultural pests may often be seen looking yellow and unhealthy, when an examination of the under side of the leaves will show that this is owing to the ravages of these minute parasites.

Botta, Anne Charlotte Lynch, American author: b. Bennington, Vt., 1820; d. 28 March 1891. She was educated in Albany, N. Y.; began her literary career in Providence, R. I., and, removing to New York, married Prof. Vincenzo Botta, in 1855. From the time of her marriage to her death, her house was a favorite centre of literary and art circles. Her publications included a collection of poems, many essays, reviews and criticisms, and 'A Handbook of Universal Literature.' She was a sculptor of much merit, and was influential in promoting the establishment of Barnard College for Women.

Botta, Carlo Giuseppe Guglielmo, Italian statesman, historian, and poet: b. San Giorgio del Canavese in Piedmont, 6 Nov. 1766; d. Paris, 10 Aug. 1837. During the time of the French Revolution he was a student of medicine at Turin, and adopting revolutionary opinions with enthusiasm, he suffered for his zeal by two years' imprisonment (1792-4). After pass-

ing as a physician he entered the French service, and accompanied the expedition which Napoleon sent to Corfu, and he was soon after elected as a member of the provisional government of Piedmont. When this territory was, in 1803, annexed to the French empire, Botta was elected a member of the Corps Législatif, where his behavior was characterized by a bold opposition to the emperor. During the "Hundred Days" he was rector of the academy at Nancy, and after the second return of the Bourbons he went in a like capacity to Rouen. The greater part of the remainder of his life was passed by him as a private gentleman at Paris. His chief works belong to the department of history. Among these are: 'Storia della Guerra dell' indipendenza degli Stati Uniti d'America'; 'Storia d'Italia dal 1789 al 1814' (10 vols.). He also furnished a continuation to Guicciardini's Italian History from 1490-1534, bringing it down to 1789.

Botta, Paul Emile, French traveler and archæologist: b. about the beginning of the 19th century; d. Poissy, April 1870. He was a son of Carlo Giuseppe Botta (q.v.). While still very young he made a voyage round the world, traversed the western portion of America, and took part as physician to Mehemed Ali in an expedition which set out from Egypt to Sennaar, of which he took advantage to make a considerable zoological collection. At a later period he was appointed French consul at Alexandria, and from this place he undertook a journey to Arabia in 1837, the scientific results of which he communicated to the world in his 'Relation d'un Voyage dans l'Yémen.' His chief service to science consists in his having discovered the ruins of ancient Nineveh, a discovery made by him in 1843 in the course of excavations in the neighborhood of Mosul, which he conducted with great energy and ability while acting as consular agent for the French government at that town. As the result of investigations made upon the spot he published two important works, one on the cuneiform writing of the Assyrians, 'Mémoire de l'Ecriture Cuneiforme Assyrienne,' and the other upon the monuments of Nineveh, 'Monuments de Ninive' (5 vols. folio, with drawings by Flandin, Paris). The latter is a work of great splendor, and marks an era in Assyrian antiquities. From 1847 to 1857 Botta lived as French consul-general in Jerusalem, and from 1857 to the end of his life in the same capacity at Tripoli.

Botta, Vincenzo, Italian scholar: b. in Piedmont, 11 Nov. 1818; d. 5 Oct. 1894. He was elected to the Sardinian parliament in 1849. In 1853 he settled in the United States and was appointed professor of the Italian language and literature in the University of New York. He published 'Dante,' 'Modern Philosophy in Italy,' and other studies.

Bottari, Giovanni Gaetano, Roman Catholic prelate: b. Florence, 1689; d. 1775. After completing his studies he was admitted a member of the Academy della Crusca, and entrusted with the preparation of the celebrated dictionary of that body. He labored for six years on this work, which was published in 6 volumes folio. The ability which he displayed in it induced the Duke of Tuscany to give him the management of the grand-ducal printing office. He left Florence in 1730 and settled in Rome, where

Pope Clement XII. appointed him professor of ecclesiastical history and polemics in the Collegio della Sapienza; the same year he was appointed palatine prelate. Shortly after he was employed with the geometer Manfredi in examining the course of the Tiber from Perugia to the mouth of the Nova, with the view of rendering it navigable, and providing a remedy against its devastating inundations. The excellent report on the subject, though signed by Manfredi, is said to have been drawn up by Bottari. As a compensation for the performance of this task, the Pope appointed him keeper of the Vatican library. After living under several Popes, all of whom treated him with favor, he died at the age of 86. His works, in addition to those already mentioned, are partly original and partly corrected editions of celebrated writings previously published. Among the former are 'Lectures on Boccaccio, Livy, and Dante'; among the latter is a splendid edition of Virgil, with a learned preface and notes, and a corrected edition of Vasari's 'Lives of the Painters.'

Bottesini, Giovanni, Italian musician: b. Crema, Italy, 24 Dec. 1822; d. 7 July 1889. He was taught the double-bass in Milan, by Luigi Rossi, according to the method of Andreoli and Dragonetti, and soon became a first rate performer; meanwhile studying musical composition under several distinguished masters. When scarcely 23, he was engaged as contrabassist for the Italian opera in Havana, where in a few seasons he rose to the post of *maestro* and musical director of the company. Here he produced in 1846 his first opera, 'Cristoforo Colombo.' During the five years of his stay in Havana, he paid occasional visits to the United States, where he secured considerable fame by his wonderful performances in the concert room. His masterly handling of the huge instrument took everybody by surprise, while his style, at once elegant and impressive, won the admiration of all critics and amateurs. His success on his return to Europe in 1851 was not less complete; the concerts he gave in London and Paris established his reputation as the first living contrabassist. In 1853 he returned to the United States with M. Jullien, and afterward accompanied Madame Sontag to Mexico. Subsequently he became director of the orchestra at the Italian opera in Paris, where his opera 'L'Assedio di Firenze' was successfully performed during the spring of 1856. Other works are: 'Ali Baba' (1871); 'Ero e Leandro' (1879); 'Garden of Olivet' (1887), an oratorio. He also published numerous overtures, symphonies, and quartettes.

Böttger, or Böttcher, also written **Böttiger, Johann Friedrich**: b. Schleitz about 1681; d. Dresden 13 March 1719. He was a Saxon alchemist whose pretended discovery of the philosopher's stone resulted in the useful invention of Saxon porcelain. After various vicissitudes he handed over to King Augustus II. an account of his discovery, which is still preserved in the archives of Saxony. The king, however, not availing himself of his suggestions, they were put in application by Count Tschirnhausen, who established a manufactory at Weissen in 1705, employing Böttger, who succeeded in producing of the reddish-brown clay which abounds in the vicinity of Weissen a porcelain of remarkable beauty and solidity.

Botticelli, Alessandro Filipepi, ä-lës-sän'-drô fil-i-pä-pë bôt-te-chël'lë, Italian painter of distinction commonly called Sandro Botticelli: b. Florence 1477; d. there, 17 May 1510 or 1515. His name is derived from that of Botticello, his first master, a goldsmith, from whom he acquired his knowledge of gold afterward made useful by his employment of it in foliage, hair, and embroidered tissues. He subsequently became one of the most distinguished pupils of Filippo Lippi, the Carmelite, and is reckoned the richest and most fanciful colorist of the Florentine school. He excelled both in devotional and mythological subjects and was an admirable painter of flowers. He was employed by the most influential art patrons of his time, including Lorenzo de Medici. About 1481 he was commissioned by Sixtus IV. to paint the walls of the Sistine Chapel; three of the frescoes there are his work: 'The Life of the Muses'; 'The Temptation of Christ'; 'The Punishment of Korah, Dathan, and Abiram,' and several of the portraits of the Popes. He became an ardent follower of Savonarola, and is said latterly to have neglected his art and suffered many privations. He is said to be one of the engravers of a celebrated series of illustrations executed by Florentine artists toward the close of the 15th century, notably a set of designs for the 'Divina Commedia' of Dante, of which 686 are in the Berlin Museum. His works are to be found in various European galleries, his Madonnas being especially characteristic of his style. In these the Virgin appears peculiarly slender and with a melancholy expression as if oppressed by forebodings. He was greatly esteemed by his contemporaries, but subsequently fell into disfavor. Although opinions as to his merits differ widely, Botticelli is to-day very popular and forms the theme of much art discussion. See Ulmann, 'Sandro Botticelli' (1893); Pater, 'Studies in the History of the Renaissance' (1873); Phillimore, 'Botticelli' (1894); Berenson, 'Florentine Painters of the Renaissance' (1898); Supino, 'Sandro Botticelli' (1900); Steinman, 'Botticelli' (English translation 1901).

Böttiger, Karl August, German writer, particularly distinguished as an archæologist: b. Reichenbach, Saxony, 8 June 1760; d. Dresden, 17 Nov. 1835. After a philological course at Leipsic, he became in the first place a private tutor at Dresden, and then successively headmaster of a school at Guben, and another at Bautzen. In 1791, through the influence of Herder, he became director of the gymnasium at Weimar, and it was here that, while he enjoyed the society of Goethe, Schiller, Wieland, and other distinguished men, he began his fruitful literary career. In 1804 he removed to Dresden, where he devoted himself exclusively to archæology. Ten years later he was appointed chief inspector of the Museum of Antiquities in that city, where he continued to reside to the end of his life. In 1832 he became a member of the French Institute. Among his most important works are: 'Sabina, or Morning Scenes of a Wealthy Roman Lady'; 'Griechische Vasengemälde' ('Paintings on Greek Vases'); 'Thoughts on the Archæology of Painting'; 'Mythology of Art'; 'Lectures and Essays on Archæology'; 'Amalthea' (3 vols.).



BOTTICELLI.
Nymph and Centaur

BOTTLE — BOTTLING

Bottle, a vessel designed to hold liquids, constructed of various materials and in various forms according to the necessities of local manufacture and the demands of the kind of liquid to be enclosed. It is now understood to mean a vessel made of glass, with a more or less narrow neck and mouth. In ancient times, however, the bottle was nothing more than a skin of some animal. Thus the Biblical aphorism concerning the putting of new wine into old bottles as an illustration of folly means that it would not be wise to trust a new wine, while yet active with fermentation, to the chance of bursting a leathern vessel necessarily weakened by use and age. In Spain, Turkey, India, and some parts of South America to this day, various skins, and especially that of the goat, are used for containing wine and water. The hide is stripped from the animal as entire as possible, and the various natural openings having been sewed up, with the exception of that of one of the legs, which is retained as a nozzle, the vessel is ready, after a certain preliminary curing of the skin, for the reception of the wine. The peculiar taste of Amontillado sherry is supposed to be owing to the fact of its being kept in leather. The ordinary bottle is, however, of glass. The various bottles used for different well-known purposes are generally distinguished by peculiar shapes and sizes, as, for example, the English wine, beer, ale, and soda bottles, the French champagne, Burgundy, and claret, and the Rhenish wine bottles. Port wine is occasionally put into very large bottles, called magnums, and acids in still larger ones termed carboys.

Bottle Charts, maps of the terminal points of the voyages of sealed bottles thrown into the sea, and either drifting to land or picked up afloat. These bottles had long been used by the victims of ship-wreck to convey messages or record their fate, or by travelers or seamen for joke or experiment; but the first serious note taken of them was by Lieut. Becher of the British navy, who in 1843 published in the 'Nautical Magazine' a Mercator chart of the Atlantic coast from lat. 6° S. to 63° N., or say from Cape St. Roque, in Brazil, to Hudson Strait, with straight lines from start to finish of a number of bottle voyages he had noted, the length of these lines, time elapsed since set afloat, etc. Of course some bottles leak and founder and others are crushed; but he was able to collect 119 bottles, one of which had traveled 3,900 miles in a straight line, and of course far more in fact, and 4 over 2,000, while the time of voyage varied from 3 days to 16 years. This chart has been repeatedly freshened up with new facts, re-engraved, and republished in the 'Nautical Magazine.' Later, several government departments, of which the United States Hydrographic Office is far the chief, have used this method systematically for the study of ocean currents. The office furnishes shipmasters with papers for inclusion in bottles, containing requests in several different languages for their delivery, with date and circumstances of finding, to the nearest United States consul, who will forward them to Washington. By this means three or four hundred new bottle voyages have been registered, with curious results. In general, their track is remarkably uniform, given the same local conditions. Of two bottles thrown out from the

Blonde within five days in 1826 (one of Becher's list), one was picked up 14 and the other 16 years after at the same spot on the French coast. Yet the effect of local winds is so great that of two set afloat simultaneously at the same spot, one was picked up on the Shetlands, the other on the west coast of France. Just north of the Azores, the surface conditions are so variable that of five bottles thrown out in one summer within 100 square miles, one drifted to the coast of Norway, two to the west coast of Ireland, one to France, and one to Spain. The longest recorded voyage was about 8,500 miles, from the Allertons, south of the Falkland Islands, to the shore of the great Australian Bight, in a little less than three years.

Bottle-gourd. See CALABASH.

Bottle-tree, a medium-sized Australian tree (*Sterculia rupestris*) of the natural order *Sterculiaceae*, whose trunk resembles an urn rather than a bottle in form. From the top of the globular stem, as from the mouth of a bottle, the branches extend. They bear lanceolate leaves two to four inches long, and axillary panicles of inconspicuous flowers followed by leathery six-seeded follicles. The soft brittle wood is of little economic value, but the stems are said to contain much water, which is frequently obtained by the natives and by travelers. Some other allied species, also called bottle-tree, furnish edible mucilaginous roots which are largely used by the aborigines.

Bottlenose, or **Bottlehead**, a small Arctic and North Atlantic whale (*Hyperoodon rostratus*) closely allied to the sperm whale, and so called from the dolphin-like shape of its head or snout, where the two pointed teeth are in the lower jaw. Placed farther back than ordinarily, and in smaller proportion, is a dorsal fin; the skin is smooth, and glossy, lead-colored on the back, graduating into white on the belly. These whales travel in small bands, generally keeping just south of the Arctic ice, and moving northward during the breeding season. They feed mainly on deep-water squids, for which they dive to great depths. Their chief value lies in the amount of oil and spermaceti that they yield.

Bottling, the process of enclosing liquids in bottles; including the operation of stopping or corking. The use of bottles for retaining liquids involves three requisites: that they shall be clean enough not to injure the purity, taste, or looks of the contents, or the looks of the bottle, or to cause chemical action which will do so; shall be strong enough to resist the probable pressure; and shall have stoppers which will not be disintegrated or corroded, and will be tight enough not to let air in or volatile substances out, the degree of such precaution varying with the liquid. For scientific preparations, which includes chemical analysis in criminal cases, an indispensable condition is that the bottle shall contain no impurities which would cast doubt on the result; hence chemists in such cases use only new bottles, cleanse them thoroughly with some preparation to remove external substances, and expose them to a red heat before using. For common household use, as there is no bottling under pressure, the kind or weight of glass is of no importance. For cleaning, it is best to shake up with warm water and caustic soda and clean with a bottle-

BOTTOM—BOTTOMRY

brush; to clean out gummy residues like paraffine from naphtha and gasoline bottles, shake up with sulphuric acid.

The material of the stopper is of the first importance. For scientific use, only glass is possible; as also to retain corrosive acids, and perfumes that would pass through the pores of a cork, in which latter case also nice taste as well as security is a desideratum. In general family use, for volatile fluids like gasoline and naphtha, and ammonia which might soak up and disintegrate the cork and let its gas escape, rubber is the usual stopper. In commercial bottling on a large scale, of beer, wine, mineral waters, and carbonated beverages generally, the only stoppers used are cork and rubber, except in the case of siphons with valves. For wine, the old-fashioned long cork, driven deep in and pulled with a corkscrew, still holds the field. The common stopper for "soft" drinks, and in part for beer, is a "terraced" rubber one fastened to the under side of an iron cap, and attached to the neck of the bottle by a wire loop whose leverage forces the rubber tightly into the mouth of it, and can be easily thrown off and the stopper removed. But in the United States, for beer even the rubber stopper is rapidly being displaced by a patent cork made in Baltimore, consisting of a crimped metal cap lined with cork, which a machine tightens around the neck of the bottle. It is easily lifted off by an iron ring, thrown over the neck and pulled up by a short handle; is much cheaper than the permanent rubber, and nearly as handy; and is cleaner, as good houses use only new ones. Indeed the use of old corks recleaned belongs to a low grade of goods. For milk bottles and others of which the corks are to last but a few hours, and need no strength, pasteboard or wood-pulp are much used.

Old bottles, however, are used over and over; and here thorough cleanliness is a prime requisite, both for salability and because dregs of old liquor might ferment and ruin the new. If any corks have been driven in, they are extracted by machinery; for the rest, in the large establishments, the bottles are placed in rows of pockets on the surface of a large drum, which their weight, as the upper rows are added and the emerging ones taken off, causes to revolve slowly through a vat of hot solution of caustic soda, which enters the open mouths and eats out the sticky remnants of the last filling. They are then taken out and placed by sets, inverted, in a frame over revolving brushes, now consisting almost entirely of two or three rubber prongs held apart by strings or centrifugal force,—the old bristle brushes being disused because they wear out and leave bristles in the bottles,—at a speed of from 2,500 to 3,000 times a minute; then rinsed in frames of from two to four dozen vertical sprinkling tubes, over which the bottles are set, and jets of hot water forced into them. The filling is done by siphonage, or air or gas pressure. A simple form for small breweries is an open trough filled from a barrel, and supplying several siphon tubes which the operator starts by sucking them, shifting the bottles as fast as filled; the siphon is tilted up by the weight of the bottle enough to give a flow, and the liquid in the trough is kept at a constant level by a float. But in the larger ones, a row of barrels or hogsheads is drawn upon by a set of rubber pipes with stop-cocks, to which the bot-

tles are held and filled by means of air or gas pressure, one pipe having several branches. With carbonated beverages there is danger of the bottles bursting, and they are filled in iron cages open only at the top, to protect the workmen; with heavily charged waters in siphons, the latter are of tougher glass and are tested beforehand, and the men sometimes wear rubber coverings for face, hands, or body. With flavored or sweetened drinks, the sirup is fed into the bottle from one spout while the carbonated water comes from another; in small works, however, the sirup is put in first and the bottle filled right-side up.

The recrimping of patent corks has been described; the old-fashioned long corks are shaped by a compressor and driven into the bottles by a plunger, operated either by hand or foot, or a self-feeder which can do 2,000 an hour. The corks are previously thrown into a hollow revolving drum for several hours, to rub against and batter each other, which knocks off the loose chips and shakes out the dust; then soaked and rinsed. There are wiring machines for either the small wires over the long corks, or the hinged wires with the rubber stoppers. The bottles when filled and corked are labeled by a machine, usually the bottles being laid in a crib with expansible sides, and a plunger forcing them down against the label, which at the same time is picked up and moved under the bottle across a paste roll; sometimes the label is pressed against the bottle. The speed of this process is practically limited only by the ability of the workman to feed bottles to the machine. A special label is sometimes fitted over the cork, for security against refilling the bottles of a reputed firm with inferior liquors. Sometimes the corks have a stamp or brand burnt into them with a hot die pressed down by a machine. Finally, the corks are often covered with tinfoil or caps of some kind; the former is done by hand.

Much capital is invested in this business, and there is a national association composed of manufacturers. Returns are made by nearly all these firms and companies to the association, from which it appears that this industry employs nearly 30,000 persons; it serves 4,489,038 customers, owns 22,940 horses, employs a capital of nearly \$51,000,000, and owns bottles to the value of \$12,747,633. Its loss of bottles annually is \$3,522,804. In this line are consumed annually, besides bottles, corks in great number, wire, patented arrangements for closing bottles, paper boxes for holding bottles, sealing wax, and labels. The cost of these materials is given at \$7,937,001. The capacity of corking-machines reaches 2,000 bottles per hour; that of labelling-machines 12,000 bottles daily.

Bottomry is the hypothecation or pledge of a vessel for the payment of a debt. The creditor has no right to take possession of the ship until the expiration of the time for which the loan is made, and then (under a bottomry contract in the usual form) only by the intervention of an admiralty court. If the loan is not repaid at the stipulated time, the lender applies to an admiralty court, which (the truth of the claim being established) decrees a sale of the ship to satisfy the debt. The conditions of such a contract usually are that, if the ship is not lost or destroyed by those risks which the

lender agrees to run, the debt is to become absolute. The risks assumed by the lender are usually the same as are enumerated in a common policy of insurance. If the ship is wholly lost in consequence of these risks, the lender loses his loan. In case of a partial damage, the bottomry bond usually provides that this damage shall be borne by the lender in the proportion of the amount loaned to the value of the ship. If this amount is equal to half the value of the ship, the lender is to bear half the amount of such loss, etc. As the lender thus assumes a certain risk he is justly entitled to a greater interest than if he did not thus take the hazard of the loss of the whole loan; and this is called "marine interest." He is entitled to the usual rate of interest on his loan, in addition to the usual premium of insurance for the same voyage or period. The stipulation for such a rate of marine interest is not a violation of the laws against usury, for it is not merely a compensation for the use of the money lent, but also for the risk assumed. The ship-owner may borrow money on bottomry whether his vessel be in port or at sea. But the captain of the ship, as such, cannot so borrow when in the port where the owner resides, or near enough to consult him on any emergency. In any other port he may pledge the ship on bottomry for the purpose of raising money necessary for repairing, supplying, and navigating her, if he can obtain it in no other way. If he borrow thus without necessity the bond is void, and the lender can look only to the personal responsibility of the captain.

Botts, John Minor, American legislator: b. Dumfries, Va., 16 Sept. 1802; d. Culpeper, Va., 7 Jan. 1869. He studied law and in 1833 entered the Virginia legislature. He was elected to Congress in 1839 and was frequently re-elected. Upon the outbreak of the Civil War he asserted his devotion to the Union, and in 1862 he suffered imprisonment on that account. After the war he published 'The Great Rebellion, Its Secret History, Rise, Progress, and Disastrous Failure'; was one of Jefferson Davis' bondsmen; and attended the Convention of Southern Loyalists in Philadelphia.

Botulism, bôt'û-lîsm, a form of poisoning due to the eating of tainted sausages, ham, head-cheese, or other impure meats. As a rule a certain stage of decomposition has taken place in the meat. Bacteria are abundant and generate toxins, some of which are responsible for the symptoms, which are those of acute gastrointestinal irritation. There is usually a period of from 12 to 24 hours (even 48 hours) after the eating of the meat before symptoms develop. The symptoms are various; there may be intense muscular weakness, with sudden nausea and vomiting; chills, small rapid pulse, cold extremities, headache, and pain are also present. Following the chilly sensations the temperature may rise, even to 103° or 104° F. Cramps, delirium, hallucinations, diarrhoea, and intense prostration may also be present. In some sudden and severe cases death has resulted with cholera-like symptoms. Recovery is very protracted. Many of the cases resemble internal hemorrhage, and great difficulty sometimes exists in the diagnosis. There are, however, more intestinal symptoms as a rule in meat poisoning (ptomaine poisoning). Abstaining from

all tainted meats is the sole preventive. See POISONS.

Boturini Benaduci, bôt-û-rê'nê bâ-nâ-doo'-chê, **Lorenzo**, Italian antiquarian: b. Milan about 1702; d. Madrid about 1750. In 1736 he went to Mexico and traveled there among the Indians, collecting a large number of their writings and valuable Spanish records; these finally came into the possession of the Mexican government and have been mostly lost or destroyed. He afterward lived in Spain, where he held the office of historiographer for the Indies. He wrote 'Idea de Una Nueva Historia de America.'

Bot'zen, or **Bolzano**, bôl-tzä'nô, Austria, a town in the Tyrol, 54 miles south of Innsbruck, at the confluence of the Talfer with the Eisack. It is a well-built, flourishing town, surrounded by a wall two miles in length, built to protect it from a mountain torrent close by. The parish church is a Gothic building of the 14th century, with an elegant spire; adjoining it is the new cemetery. The other objects worthy of notice are: the church of St. Nicholas, a gymnasium, custom-house, two monasteries, a normal school, and a nunnery. It has some silk and woolen manufactures, tanneries, dye-works, etc. Botzen has an important transit trade, and has four annual fairs, resorted to by commercial travelers from all parts of Italy and Germany. In the environs wine and fruits are produced. Pop. about 12,000.

Bouch, bowch, **Sir Thomas**, English civil engineer: b. Thursley, Cumberland, 22 Feb. 1822; d. Moffat, 30 May 1880. He was early attracted to engineering studies, and in 1839 began his apprenticeship to a civil engineer in the north of England. He was a resident engineer on the Stockton & D. Ry. for a period of four years, and in 1849 went to Scotland as manager and engineer of the Edinburgh & Northern Ry. While in the service of this company he devised a sort of floating railway for carrying goods trains across such estuaries as those of the Forth and Tay. After this he was for a time engaged in railway construction in England. He was engineer of the first railway bridge across the Tay, which was completed in September 1877, and opened in May of the following year. For this he received the freedom of Dundee, and in 1879 the honor of knighthood. On 28 December of that year the bridge gave way during a stormy night, while a train with some 70 passengers was crossing. All were drowned, and the accident caused such severe mental distress to Sir Thomas Bouch that it undoubtedly hastened his death.

Bouchardon, Edmé, êd-mâ boosh-âr-dôn, French sculptor: b. Chaumont-en-Bassigny, 1698; d. Paris, 27 July 1762. In order to devote himself to statuary he went to Paris and entered the school of the younger Coustou. He soon gained the highest prize, and was made royal pensioner at Rome. The Duke d'Antin recalled him to Paris and gave him a studio at the Louvre. He assisted in repairing the fountain of Neptune at Versailles, and executed 10 statues which adorn the church of St. Sulpice. The fountain in the Rue de Grenelle, which the city of Paris ordered to be constructed in 1739, was made by him, and is considered his masterpiece. The execution of the greatest monument of that period, the equestrian statue of Louis

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XV., which was erected by order of the city of Paris, was committed to him. He labored 12 years on this with inconceivable perseverance, and has left in the horse a model which may be ranked with any work of antiquity. His pieces bear the character of simple grandeur, but, in general, more fire is to be desired in his sculpture. Latterly he adopted a more polished, delicate manner, to suit the taste of the age. Caylus has written his life.

Boucher, boo-shā, Alfred, French sculptor: b. Bouy-sur-Orvin, 1850. He studied under Dumont and Paul Dubois. His statues include 'Venus Astarte' and 'At the End,' both bought by the French government for the Luxembourg Gardens; 'Eve After the Fall'; 'The Earth'; and 'A Sleeping Woman.'

Boucher, François, frān-swā, French painter: b. Paris, 29 Sept. 1703; d. 30 May 1770. While a pupil of the celebrated Lemoyne he gained at the age of 19 the first prize of the Academy. He produced with remarkable facility, and his sketches alone amounted to more than 10,000. He also etched some plates, and many of his paintings have been engraved. Some of his more important works are: 'L'Aurore et Céphale'; 'Diane Sortant du Bain'; 'Femme Couchée'; 'Le But'; 'Le Repos en Egypte'; etc. He was a director of the Academy of Painters.

Boucher, bow'-chér, Jonathan, English clergyman: b. Cumberland, 12 March 1738; d. Epsom, 27 April 1804. He came to Virginia about 1754; officiated first as private teacher, and, after receiving episcopal ordination in England, as rector in Virginia and Maryland until 1775, when he returned to his native country, his anti-revolutionary sentiments having given umbrage to his American congregation. From 1784 to the time of his death he officiated as vicar of Epsom, Surrey. He is the author of a glossary of provincial and archæological words, which was intended by him as a supplement to Dr. Johnson's dictionary. In 1799 he published 2 assize sermons, and 15 sermons which he had delivered during his ministry in America, and which treated of the American Revolution. These he dedicated to Washington; they are interesting from the political anecdotes which they contain.

Boucher, Pierre, pē-ār boo-shā, French pioneer in America: b. Perche, France, 1622; d. Boucherville, Canada, 20 April 1717. He came to Canada in 1635, took part in an Indian war, and was sent to France in 1660 as a deputy for the colony of New France. He was later made governor of Three Rivers. He wrote 'A True History of the Customs and Products of New France.'

Boucher de Crèvecœur de Perthes, Jacques, zhāk boo-shā dē krāv-kèr-dē pārt, French anthropologist: b. Réthel, 10 Sept. 1788; d. Abbeville, 5 Aug. 1868. Through his father, an active botanist, he came under the notice of Napoleon, and was employed in numerous missions to Italy, Germany, Austria, and Hungary. After the Restoration he lived at Abbeville. He wrote travels, poems, and an early apology for free trade; but only his works on the archæology of man are of consequence now. The first, 'On the Creation' (5 vols. 1839-41), already brought him some reputation, but his long investigations on stone weapons and other

remains of early human civilization in the Tertiary and older Quaternary Diluvial strata made him famous. His most striking discovery was that of a fossil human jawbone in the quarries of Moulin-Quignon, near Abbeville, in 1863. Other works of great value are 'Celtic and Antediluvian Antiquities' (3 vols. 1846-65); and 'Antediluvian Man and His Works' (1860).

Bouches - du - Rhone, boosh dü rōn, ("Mouths of the Rhone"), a department in the south of France, in the ancient government of Provence, bounded north by Vaucluse, west by Gard, east by Var, and south by the Mediterranean. Chief town, Marseilles. Area, 1,971 square miles, of which about half is under cultivation, the remainder being occupied by forests, heaths, wastes, water, etc. Between the Rhone and the lagoon of Berre is the great plain of La Crau. Its borders are tolerably well cultivated and support a number of cattle; but the centre is little better than a desert of stones and pebbles, affording, however, winter pasture for sheep. The Rhone is the principal river; near Arles it divides into two branches which enclose an island called La Camargue. Several canals facilitate transport and are especially useful for irrigation. The climate is generally very warm, with little rain during the summer. A cold and generally violent wind, called mistral, always blows from the Cevennes after rain. It lasts from 3 to 9, sometimes, though rarely, even 12 days, and dries up the ground with astonishing rapidity. The soil of the department is for the most part arid and unproductive without irrigation. Vines, however, thrive, and almonds, figs, capers, nuts, and particularly olives, are extensively cultivated. The minerals are of little commercial importance. Salt is extensively manufactured from the lagoons, and the salt-works of Berre are celebrated both for the quality and quantity of their produce. The articles manufactured, besides salt, are principally soap, brandy, olive oil (the best in France), soda, chemicals, vinegar, scents, leather, glass, etc. The fisheries are productive. The department includes the three arrondissements of Marseilles, Aix, and Arles. Pop. (1896) 673,820.

Boucicault, Dion, dī'on boo'sē-kō, Irish dramatic author and actor: b. Dublin, 26 Dec. 1822; d. New York, 18 Sept. 1890. He was educated at London University and wrote his first play, 'London Assurance,' when he was only 19 years old. This was produced at the Covent Garden Theatre in London and won immediate success. He made his first appearance as an actor in 1852 in his own play, 'The Vampire'; in 1853-60 he was in the United States, where his success on the stage was as great as it had been in England. He founded a theatre in Washington and reconstructed the Metropolitan Theatre in New York, but was not very successful as a manager. Returning to London in 1860 he brought out 'The Colleen Bawn,' one of his best-known plays, and was at one time joint manager of the Adelphi and manager of a new theatre, the Westminster. The latter venture was unsuccessful, but he shortly afterward brought out a number of very popular plays. In 1876 he came to New York, where he lived until his death. He continued his work as both actor and playwright, and also opened the New Park Theatre on Broadway.

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Boucicault wrote about 400 plays, many of which were adaptations; among the best not already mentioned are: 'Old Heads and Young Hearts'; 'Love in a Maze'; 'Used Up'; 'Corsican Brothers'; 'The Octoroon,' dealing with the condition of the slaves in the United States; 'The Streets of London'; 'The Shaughraun'; 'Daddy O'Dowd'; and 'Foul Play,' a dramatization of Charles Reade's novel of the same name. In 'The Colleen Bawn' he created one of his favorite types, the Irish hero that appears in many of his plays. He also rewrote and adapted 'Rip Van Winkle' especially for Joseph Jefferson's use. While writing his numerous plays he found time to engage in a political controversy with Lord Beaconsfield over the rights and liberties of the Irish people. He introduced many improvements in the staging of plays, being the first to use carpets on the stage and moving scenery.

Boucicault, Mrs. Dion, English actress. Before her marriage to Boucicault she had won success as Agnes Robertson in 'Our Clerks' and other plays. After her marriage she came with her husband to the United States, but returned with him to London in 1860 and took important parts in several of his plays. She again came to the United States and was later separated from her husband.

Boudin, Eugène, è-zhân boo-dăn, French painter: b. Honfleur, 12 July 1824; d. 8 Aug. 1898. He lived in Paris for most of his life, traveling somewhat in Brittany and Holland. He was devoted to the painting of seaports and river scenes, the gray expanses of French skies and waters, the picturesque confusion of ships in harbors. Among his works are: 'Fishing'; 'The Meuse at Rotterdam'; 'Low Tide'; 'High Tide'; 'Getting Under Sail'; 'A Dutch Bark at Antwerp'; and 'Bordeaux Harbor.'

Boudinot, boo-dī-not, Elias, American philanthropist: b. Philadelphia, 21 April 1740; d. Burlington, N. J., 24 Oct. 1821. He studied law at Princeton with Richard Stockton, and in 1760 commenced practice at Elizabethtown, N. J. He early became a devoted advocate of the patriot cause, and in 1774 was a member of the Provincial Convention which took the control of New Jersey out of Gov. Franklin's hands. Congress appointed him commissary-general of prisoners, 15 May 1777; he was elected to Congress in 1777, 1780, 1781, and 1782, and was chosen its president 4 Nov. 1782, and as such signed the treaty of peace with Great Britain. He was director of the mint at Philadelphia 1795-1805, being appointed by Washington, whose trusted friend and counselor he was throughout the Revolution and afterward. From 1772 to 1805 a trustee of the College of New Jersey (Princeton), he founded its cabinet of natural history with a liberal contribution. He was active in the organization of the American Bible Society, becoming in 1816 its first president. By his will he left the bulk of his large estate to various institutions and charities. He wrote: 'The Age of Revelation' (1790), to counteract Paine's 'Age of Reason'; 'Oration 4 July 1793,' before the New Jersey Society of the Cincinnati; 'Second Advent of the Messiah' (1815); 'The Star of the West' (1816), an attempt to identify the North American Indians with the descendants of the lost tribes of Israel.

Boudinot, Elias, Cherokee Indian: d. 10 June 1839. He was one of three Cherokee youth brought before Elias Boudinot (1740-1821) in 1818, and he received that philanthropist's permission to assume his name. He was educated at the mission school at Cornwall, Conn., and married a white lady of that place. He became a man of considerable talent and ability, and of influence among his people. In December 1835, he, with others of his nation, was persuaded to make a treaty with the United States. He was thereupon accused of having betrayed his country and was murdered by the John Ross party west of the Mississippi, 10 June 1839. He published 'An Address to the Whites' (1826), delivered at Philadelphia, 25 May 1825, and edited the *Cherokee Phoenix*, 1828-34.

Boufflers, Louis François, loo-è frân-swâ boo-flâr (Duc de, dük dé), French soldier: b. 10 Jan. 1644; d. Fontainebleau, 20 Aug. 1711. He saw active service under Condé, Turenne, Crequi, Luxembourg, and Catinat, and was created a marshal of France in 1693. His defense of Namur in 1695, and of Lille in 1708, are famous. The siege of the former place was conducted by King William in person, and cost the allies more than 20,000 men. The latter was conducted by Prince Eugène. An order was sent from Louis XIV., signed by his own hand, commanding Boufflers to surrender; but he kept it secret until all means of defense were exhausted. The retreat of the French after their defeat at Malplaquet, under the direction of Boufflers, was more like a triumph than a defeat.

Boufflers, Stanislaus, Chevalier de, shë-vä-lë-ä dë stän'is-low, French soldier and author (son of the Marchioness of Boufflers, mistress of Stanislaus, king of Poland): b. Luniville, 31 May 1738; d. Paris, 18 Jan. 1815. He entered the army, was soon appointed governor of Senegal, and while in this office made many useful regulations. After his return he devoted himself to that light kind of literature which distinguished the age of Louis XV. His reputation gave him a seat in the States-General, where he was esteemed for his moderation and his good intentions. After 10 Aug. 1792 he left France and met with a friendly reception at Reinsberg from Prince Henry of Prussia, and Frederick William II. A large grant was made to him in Poland for establishing a colony of French emigrants. In 1800 he returned to Paris, where he devoted himself to literary pursuits which in 1804 procured him a seat in the French Institute. He lies buried near the Abbé Delille, and on his tomb is this inscription, written by himself and characteristic of his lively disposition: "Mes amis, croyez que je dors." His works were published in 8 12mo volumes in 1815.

Bougainville, Louis Antoine de, loo-è äntwän de boo-gän-vël, French soldier and statesman: b. Paris, 11 Nov. 1729; d. same place, 31 Aug. 1811. At first a lawyer, afterward a distinguished soldier, diplomatist, and scholar, he was always remarkable for his energy of character. He fought bravely in Canada under Montcalm, and it was principally owing to his exertions in 1758 that a body of 5,000 French withstood successfully a British army of 16,000 men. Toward the conclusion of the battle he received a shot in the head. The governor of Canada, finding himself unable to

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defend the colony, sent Bougainville to France for reinforcements. He set off in November 1758, and returned January 1759, after the king had made him colonel and knight of St. Louis. After the battle of Quebec, 13 Sept. 1759, in which Montcalm was killed, and the fate of the colony decided, Bougainville returned to France and served with distinction under Choiseul Stainville, in the campaign of 1761, in Germany. After the peace he entered the navy and became one of the greatest naval officers in France. He persuaded the inhabitants of St. Malo to fit out an expedition for the purpose of establishing a colony in the Falkland Islands, and undertook the command of the expedition himself. The king appointed him captain, and Bougainville set sail with his little fleet in 1763. But as the Spaniards had a prior claim to the islands France was obliged to surrender them, and Bougainville, having returned to France, was commissioned to carry the surrender into execution on receiving from Spain a remuneration for his expenses. For this purpose he set sail with one frigate and a merchant ship from St. Malo, 15 Dec. 1766. After the immediate object of his voyage was accomplished he circumnavigated the world and returned to St. Malo 16 March 1769. He enriched the science of geography by a number of new discoveries. In the American war he commanded several ships of the line with great honor; was in 1779 chief of squadron and in the following year field-marshal in the land forces. After 1790 he devoted himself to science, and in 1796 was admitted to the Institute.

Bougainville Island, an island in the Pacific Ocean, belonging to the Solomon group and under German protection; area, 4,000 square miles. It is separated from Choiseul Island by Bougainville Strait.

Bougainvillea, a small genus of South American tropical shrubs of the natural order *Nyctaginaceæ*, largely used for ornament in warm climates and in greenhouses. Their chief beauties are their large, brilliantly colored bracts, which subtend the inconspicuous flowers. In the climbing species, which are the most popular, the bracts are so numerous as to conceal the foliage and stems as well as the walls upon which the plants are trained. They often remain thus attractive for months. Because of their ease of propagation and cultivation they are rapidly growing in popularity in the United States. For discussion of species, propagation, and cultivation, consult Bailey and Miller, 'Cyclopedia of American Horticulture' (New York 1900-2).

Bough, Samuel, English painter: b. Carlisle, 8 Jan. 1822; d. Edinburgh, 19 Nov. 1878. He never obtained any systematic art instruction. In 1845 he was a scene-painter in Manchester, and later in Glasgow, where Daniel Macnee encouraged him to become a landscape-painter; and he shortly produced 'Shipbuilding on the Clyde.' Among the more important of his oil pictures are: 'Edinburgh from the Canal' (1862); 'Holy Island' (1863); 'In the Trossachs' (1865); 'The Vale of Leith' (1866); 'Kirkwall Harbor' (1867); 'Borrowdale'; 'St. Monance'; 'London from Shooter's Hill' (1872). His 'Royal Volunteer Review' (1860) is in the National Gallery of Scotland. His best oil pictures are spirited and

expressive in touch, and possess a fine sense of atmosphere; but he frequently painted carelessly and hurriedly, and produced much, especially during his later years, that was unworthy of his brush. His numerous water-colors are of more uniform excellence; they are strongly influenced by the example of David Cox, and are especially remarkable for the delicate gray tones of their skies. He settled in Edinburgh in 1855. A collection of over 200 of his works was brought together in the Glasgow Institute in 1880.

Bought and Sold Notes, written memoranda of a transaction, made by the broker in the case, and delivered by him to his principals. They state respectively that the broker has bought for the vendee, and sold for the vendor, the subject of the transaction. When the broker has not exceeded his authority, both parties are bound thereby (4 Esp. 114; 2 Camp. 337). No particular form is required, but there are four kinds: (1) 'Where the broker professes to act for both parties, whose names are disclosed in the note. (2) Where the broker does not disclose in the bought note the name of the vendor, nor in the sold note the name of the buyer, but still shows that he is acting as broker and not as principal. (3) Where the broker, on the face of the note appears to be the principal. (4) Where he professes to sign as broker, but is really the principal' (4 Am. & Eng. Enc. Law, 751). The bought and sold notes, however, do not constitute the contract. They may, however, be accepted as evidence of the contract, and not the original contract, when so established by the usage of trade.

Boughton, bôr'tôn, George Henry, English painter: b. near Norwich, England, 1833. His parents came to the United States in 1839, and settled in Albany. He studied art without a master, and in 1853 went to London and Paris to continue his studies. Since 1861 he has resided in London. His best pictures are 'The Idyl of the Birds'; 'Hay-Harvest in Brittany'; 'The Scarlet Letter'; 'Wayside Devotion'; 'Puritans Going to Church'; 'Snow in Spring'; and 'The Return of the May Flowers.' He became a member of the National Academy in 1871; associate of the Royal Academy, London, in 1879; and member of the Royal Academy in 1896.

Boughton, Willis, American educator: b. Victor, N. Y., 17 April 1854. He graduated at the University of Michigan, and since 1892 has been professor of rhetoric and English literature at Ohio University. He has won note in the work of university extension. His writings include 'Mythology in Art' and 'History of Ancient Peoples.'

Bougie, boo-zhê', Algeria, a port on the Bay of Bougie, 120 miles east of Algiers. Bougie was the Saldæ of the Romans, and in the 5th century was a chief seat of the Vandals. Under the Arabs it was raised to such importance that it was called Little Mecca, and was the entrepôt of the trade between Christendom and north Africa; but after various vicissitudes it had sunk to a small village in 1833, when the French captured the place. Their extensive works have since rendered it a strong fortress and a commercial centre of some value. Pop. (1892) 7,862.



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WILLIAM ADOU PHE BOUGUETEAU

Bougie (Fr. "taper"), in surgery, a smooth cylindrical rod, designed to widen the canals of the human body by its introduction therein, or to apply medicaments to a particular part of the interior of the body. It is distinguished from a catheter by being solid, while the latter are hollow and open at the ends for the purpose of affording a passage for fluids. Bougies are generally pointed at one end, and grow gradually thicker toward the other end, but in some cases they are of the same thickness throughout their whole length, the ends being only rounded off. They are made sometimes of linen dipped in wax and then rolled up, sometimes of a kind of plaster and linen, also of caoutchouc or gutta-percha, or of metal, such as lead, silver, or German silver.

Bouguer, Pierre, pē-ār boo-gā, French scientist: b. Croisic, Brittany, 16 Feb. 1698; d. 15 Aug. 1758. He studied the elements of mathematics under his father, who was an able hydrographer, and is well known as the author of an excellent 'Treatise on Navigation.' In 1727 he gained a prize at the French Academy for the best essay on the masting of vessels. He gained similar prizes in 1729 and 1731, and added still more to his fame by a work entitled 'Traité de la Gradation de la Lumière,' in which he endeavors to ascertain the quantity of light absorbed by transparent bodies, explains the construction of several ingenious instruments which he had invented for the purpose of facilitating such investigations; and maintains that the light of the sun is more intense at its centre than on the edges of its disk, while in the moon the reverse is the case. About this time the figure of the earth was the subject of frequent discussion in the Academy of Sciences; and for the purpose of ascertaining exactly how much it was elevated at the equator and flattened toward the Poles, it was proposed to measure the length of a degree at each of these positions, and at the same time make other observations and experiments of importance to astronomy and navigation. An expedition was accordingly fitted out, in which Bouguer was associated with Godin and La Condamine. The main burden of the task fell upon Bouguer, who published the results in a work entitled 'Théorie de la Figure de la Terre.' A quarrel with La Condamine concerning the honors of the work embittered the latter part of his life, and probably hastened his death.

Bouguereau, Guillaume Adolphe, gē-yōm-ē äd-ölf boo-grō, French painter: b. La Rochelle, 30 Nov. 1825. After a youth of hardship courageously endured he succeeded in reaching Paris, where he was educated at the studio of Picot and at the Beaux Arts. In 1850 he gained the Prix de Rome and went to Italy to study. His first great success was 'The Body of St. Cecilia Borne to the Catacombs' in the Salon of 1854. Among his paintings are: 'The Meeting of Christ with His Mother'; an 'Annunciation'; 'The Holy Women at the Sepulchre'; 'The Triumph of Venus,' etc. He paints portraits occasionally, but his subjects are chiefly ideal, idyllic, and religious. He is a thorough draftsman, and is thought to excel in the painting of flesh. In 1885 he received the medal of honor at the Salon, was president of the Society of Artists, and received the medal of the Legion of Honor.

Bouilhet, Louis, loo-ē boo-ē-yā, French poet: b. Cany, 27 May 1822; d. Rouen, 19 July 1869. He first achieved fame with 'Melenis, a Story of Rome' in the time of the Cæsars, and 'The Fossils,' a series of delineations of antediluvians. His versified dramas, 'Mme. de Montarcy' (1856); 'Dolorès' (1862); and especially 'The Conspiracy of Amboise,' are elegant in style, rich in imagery, perfect in melody, but lack compactness of structure and are open to moral censure. The same faults are found in his comedies, 'Uncle Million' (1861); 'Faustine' (1864); and especially in his posthumous 'Mlle Aissé.'

Bouillé, François Claude Amour, frän-swä clöd a-moor boo-ē-yā (MARQUIS DE), French soldier: b. Cluzel Castle, Auvergne, 19 Nov. 1739; d. London, 14 Nov. 1800. He distinguished himself in the Seven Years' war; was appointed governor of Guadaloupe in 1768; and conquered Dominica, St. Eustatia, Tobago, St. Christopher, Nevis, and Montserrat. After the Peace of 1783 he returned to Paris and was appointed lieutenant-general. He afterward traveled in England, through Holland and a great part of Germany, until he was made chief of the province Trois-Evêchés. In the Assembly of Notables (1787-88) he declared for the proposed reforms of Calonne, which, however, were defeated by Cardinal Brienne. He was opposed to the plan of Necker for the union of the provinces. At the breaking out of the Revolution he supported the existing government, both in his former province and in Lorraine, Alsace, and Franche-Comté. It was only at the urgent desire of the king that he swore allegiance to the constitution of 1791. He repressed in 1790 the rebellion of the garrisons of Metz and Nancy; and although the National Assembly decreed him a vote of thanks for the bravery and ability he had displayed on this occasion, still the revolutionists distrusted him. Shortly afterward he made preparations to assist Louis XVI. in his escape. Bouillé had made his arrangements well, and had not the king forbidden any bloodshed he certainly would have rescued him. Being thus compelled to leave the king at Varennes to his fate, he fled from the dangers to which he himself was exposed by the attacks of the revolutionists. From Luxembourg he wrote a threatening letter to the National Assembly, and then exerted himself to excite the foreign powers against the republic. He succeeded well at Vienna, gained over Gustavus III., and obtained the promise of 30,000 men from the Empress Catherine II., to be put under the command of the king of Sweden and the French general. But Gustavus was murdered, the empress forgot her promises, and Bouillé went over to England in 1796. Here he wrote his 'Memoirs of the Revolution,' which appeared in an English translation (Lond. 1797), and, after his death, in the original.

Bouillon, boo-ē-yōñ, the name of one of the most distinguished historical families of France. The last Duke of Bouillon of the first line had sold the duchy to the bishop of Liège, but a new line arose toward the end of the 15th century. It originated with a cadet of the house of Marck, which, at the commencement of the 15th century, possessed the principality of Sedan. In 1482 William de la Marck, well-known as "The Boar of Ardennes," seized the

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territory of Bouillon, belonging to the bishopric of Liège, and conferred it on his brother Robert. The bishop of Liège attempted by force to regain it, but this Robert, and a son of the same name who succeeded him, were successful in resisting; and at the end of the war, which was brought to a close in 1492 by the mediation of the king of France, Robert the younger remained virtually, if not formally, Lord of Bouillon. The third Robert succeeded his father last mentioned; and having, like his predecessors, entered the service of France, was made prisoner with Francis I. at the battle of Pavia. He afterward obtained a marshal's baton, and under the name of Marshal de Fleuranges, which was the title he assumed, is known as the author of very curious memoirs. Robert IV., son of Robert III., appears to have been temporarily dispossessed by the bishop of Liège, but recovered possession, and not only became marshal of France, but received the title of Duke, and thus became the first Duke of Bouillon of the new line. He was taken by the Spaniards at the siege of Hesdin in 1553; and three years after, when he had been liberated on parole for the purpose of procuring the 60,000 crowns at which his ransom had been fixed, died by poison. His wife was a daughter of the celebrated Diana of Poitiers. His son, Henry Robert, lost Bouillon, which, by the Treaty of Château-Cambray, returned to the bishop of Liège, but he still preserved the title, and transmitted it to his son William Robert, who died in 1588 without having married. The male line thus became extinct. He was survived by a sister, who married Henri de la Tour d'Auvergne, Viscount Turenne, but died without children in 1594. She had, however, bequeathed her possessions to her husband, and thus the two powerful houses of Turenne and Bouillon were merged into one. This new Duke of Bouillon was one of the most distinguished personages of his time. He was at first devotedly attached to Henry IV. while he was fighting his way to the throne, but afterward leagued with his enemies; and, being implicated in the conspiracy which cost Marshal Biron his life, was long obliged to live in exile. He was restored to favor in 1606, and figured much during the intrigues in the subsequent part of the following reign; and, having embraced the doctrines of the Reformed Church, became one of its most distinguished leaders. He died in 1623, leaving two sons, the younger of whom was the celebrated Marshal Turenne. The elder, named Frédéric Maurice, after serving with distinction in the Low Countries, returned to France, became a Roman Catholic, served Louis XIII., then joined the insurrection against him headed by the count of Soissons, and helped him to gain the battle of Murfée. During the Fronde he joined the princes and took a prominent part in the civil war, but was reconciled to the court in 1651, obtained the title of prince, and received large accessions of territory in exchange for the principality of Sedan. He died in 1652, leaving interesting memoirs of his life and times. He was succeeded by Godefroi Maurice, who figured much in the wars of the period and became great chamberlain to Louis XIV., and who died in 1721. One of his brothers was the celebrated Cardinal de Bouillon, who was born in 1644, obtained the cardinalate when only 26 years of age, was long the representative of the

Gallican Church at Rome, made himself notorious by his vanity, ambition, and intriguing spirit, and died in 1715.

Bouillon, originally a German duchy, now a large district in Belgium, 9 miles wide and 18 long, on the borders of Luxembourg and Liège. This woody and mountainous tract consists of the town of Bouillon with 2,800 inhabitants, and 25 villages with 20,000 inhabitants. The town was once the capital of the duchy of the same name. This ancient place lies in the midst of hills, on the left bank of the Semois, which abounds with fish, 40 miles from Liège and 8 from Sedan. It has a strong castle upon a rock, which, however, is commanded by the neighboring mountains. Godfrey of Bouillon once possessed the dukedom of this name. He was Duke of Lower Lorraine, and Bouillon was bestowed upon him as belonging properly to the county of Ardenne. In order to supply himself with funds for his expedition to the Holy Land, Godfrey mortgaged his duchy of Bouillon in 1095 to the bishop of Liège. After the estate had been held for many years by the bishopric, the houses of La Marck and La Tour d'Auvergne laid claims to Bouillon, but in 1641 relinquished their pretensions to the bishop of Liège for 150,000 Brabant guilders. In the war of 1672 France conquered Bouillon, and Louis XIV. gave it in 1678 to the Chevalier La Tour d'Auvergne, his chamberlain. After this time it belonged to the house of La Tour until the Revolution, when it was taken from them in 1792. The last possessor, Godfrey Charles Henry de La Tour d'Auvergne, died December 1812. By the Peace of Paris, in 1814, the dukedom was included in that of Luxembourg, which had fallen to the king of the Netherlands. The title of prince of Bouillon was assumed in 1792 by Philip d'Auvergne, captain in the British navy, and he continued to bear it till his death in 1816. The congress which met at Vienna in 1815 appointed commissioners to investigate the comparative claims of this nobleman and Prince Charles of Rohan. They decided in favor of the latter. By him it was sold to the Netherlands in 1821, and on the division of the kingdom at the revolution of 1830 it fell to Belgium.

Bouilly, Jean Nicolas, zhōn nē-kō-lār boo-ē-yē, French poet: b. Coudraye, 4 Jan. 1763; d. Paris, 14 April 1842. He made his début with the comic opera 'Peter the Great' in 1790. For a few years he was judge and prosecuting attorney at Tours, and then was called to Paris to assist in organizing the primary school system. He was a man of ancient Roman virtue, and his character is reflected in all his works. His comedies and comic operas (music by the first masters) were eminently successful as well in Germany as in France, particularly 'The Abbé de l'Epée,' 'The Two Days,' 'Mme. de Sévigné.' He also wrote 'Stories for French Children,' and 'Counsels to My Daughter.'

Boulainvilliers, Henri de, ōn-rē dē boo-lān-vē-yā, French historian: b. Saint Saire, Normandy, 11 Oct. 1658; d. 23 Jan. 1722. He studied at the College of Juilli, entered the army, but shortly after became devoted to historical and antiquarian pursuits. He wrote a number of works in connection with the history of France, but is perhaps best known by his 'History of Mohammed,' in which he writes in a very Oriental style, lauds the Prophet, and

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seems almost disposed to become a believer in the Koran. He is said to have been much addicted to astrology.

Boulanger, Georges Ernest Jean Marie, zhōrzh ār-nēst zhōn ma-rē boo-lōn-zhā, French soldier: b. Rennes, 29 April 1837; d. Brussels, 30 Sept. 1891. After a successful career in Algeria and in the East he became minister of war in 1886, and the fact that a new man was in possession of that portfolio was speedily felt. He introduced many needful reforms, insisted on the adoption of a repeating rifle, and caused important experiments to be made with high explosives. In the ministerial crisis of 1887 he lost his portfolio and was appointed to the command of the 13th Army Corps, but was retired, 28 March 1888. In January 1889 he was elected deputy to the National Assembly by 81,000 majority, in consequence of which the Floquet ministry resigned. In August 1889 he was charged with embezzlement, treason, and conspiracy, and found guilty by the Senate; the elections in the 12 cantons were annulled, and he was sentenced to deportation.

Boulanger, Gustave Rodolphe Clarence, goos-tav rō-dōlf kla-rōns, French painter: b. Paris, 25 April 1824; d. Paris, 22 Sept. 1888. He had a wide reputation as a painter of classical subjects; received the Prize of Rome in 1849, and was decorated with the Legion of Honor in 1865.

Boulanger, Louis, loo-ē, French painter: b. Vercelli, Piedmont, 11 March 1806; d. Dijon, 7 March 1867. He studied under Guillon-Lethière and Devérias; became acquainted with Victor Hugo and illustrated many of his works; also taking subjects for many of his paintings from the poems of Hugo and Chateaubriand. Among his paintings are 'Mazeppa,' 'The Triumph of Petrarch,' and 'Mabeth.'

Boulay de la Meurthe, Antoine Jacques Claude Joseph, ān-twān zhāk klōd zhō-zēf boo-la-ē de la mert (COUNT), French lawyer and politician: b. Chamousey, Lorraine, 19 Feb. 1761; d. Paris, 2 Feb. 1840. During the Revolution he served as a volunteer in the army, and as a judge on the bench, until the Reign of Terror, when he was outlawed. After the 9th Thermidor he was appointed presiding judge of the civil court, and afterward held the office of attorney-general at Nancy. He sat in the Council of Five Hundred, was active in the *coup d'état* of the 18th Fructidor, and aided in the revolution of the 18th Brumaire. Being appointed chairman of the legislative section in the Council of State, he took an active part in digesting the *Code Civil*. On the first restoration he kept aloof from public affairs; during the Hundred Days he was again a minister of state; on the abdication of Napoleon I. he caused his son to be proclaimed as Napoleon II., and was appointed minister of justice by the commission of government. He was, of course, outlawed by the returning king, and for four and a half years was an exile. In 1819 he was permitted to return to France.

Boulay de la Meurthe, Henri George, ōn-rē zhōrzh (COUNT), son of the preceding: French statesman: b. Nancy, 15 July 1797; d. 1858. He took an active part in the revolution of 1830. In 1837 he was elected to the chamber of deputies. In 1843 he voted for the repeal of the

decree of banishment against the Bonaparte family. In February 1848 he sided with the moderate Republicans, was elected to the Constituent Assembly, and there again supported the motion for the return of the Bonaparte family. When Louis Napoleon was elected president the name of Boulay de la Meurthe was placed by him at the head of the list of candidates for the vice-presidency; and the assembly almost unanimously chose him. After the *coup d'état* of 1851 he was made a member of the Senate.

Boulder, Col., city and county-seat of Boulder County, situated on Boulder Creek and the Union Pac. and other railroads; 29 miles northwest of Denver, the State capital. It is in a noted gold, silver, coal-mining, agricultural, and stock-raising region, at the eastern base of the Rocky Mountains. It received a city charter in 1882; is the seat of the State University; and has three national banks, daily and weekly periodicals, and a property valuation of over \$1,000,000. The famous Boulder Cañon is an object of wide interest to the tourist. Pop. (1900) 6,150.

Boulder, a rounded water-worn stone of some size; in geology, applied to ice-worn and partially smoothed blocks of large size lying on the surface of the soil, or embedded in clays and gravels, generally differing in composition from the rocks in their vicinity, a fact which proves that they must have been transported from a distance, probably by ice. When lying on the surface they are known as "erratic blocks."

Boulder Clay, the name given to the mass of clay, sand, and boulders deposited by the ice-sheet which invaded the northern portions of North America and Europe during the Pleistocene period. It is also known as "till" and "ground moraine." The material is generally compact and tenacious and shows no stratification, the stones and boulders being irregularly distributed. It represents the detritus carried along beneath the ice and finally left in its present position covering the eroded rock-surfaces upon the retreat of the glacier. Its thickness varies from a few inches to 100 feet or more; the heaviest accumulations are gathered into rounded hills called drumlins (q.v.). The stones included in boulder clay are usually oblong with rounded edges and frequently with striated surfaces, the latter being produced by the friction of the moving mass. See DRIFT; GLACIAL PERIOD.

Boulevard, bool-vār (O. Fr. *boulevard*, a word derived from the German *bollwerk*, the same as the English "bulwark"). The word was formerly applied to the ramparts of a fortified town, but when these were leveled, and the ditches belonging to them filled up, and the whole planted with trees and laid out as promenades, the name "boulevard" was still retained, and thus came to have its present signification. The most famous boulevards are those of Paris, especially those which, in the time of Louis XIV., took the place of the fortifications on the northern side of the city, and became first a promenade and then a street. Modern usage has applied the word to many streets which were not originally ramparts, but which have been cut through the older and denser parts of the town, or have been laid out in the new quarters. All that the more modern boulevards have in

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common with the older ones is that they are broad and are planted with trees. The modern boulevards are for the most part situated at some distance from the bustle of the town, and are therefore less frequented than the older ones, which are in the very heart of the city, and in the neighborhood of the chief resorts of amusement and pleasure. In the United States the name is applied to wide avenues planted with shade-trees, and with more or less ornament in the way of statuary, flower-beds, lawns, etc. The Thames Embankment, in London, though not usually called a boulevard, is of this order. See PARIS.

Boulger, Demetrius Charles, English writer: b. 14 July 1853. He is an authority on military topics and with Sir Lepel Griffin founded the 'Asiatic Quarterly Review' in 1885 and edited it for nearly five years. He has published 'Life of Jakooob, Bey of Kashgir' (1878); 'England and Russia in Central Asia'; 'Central Asian Portraits'; 'The History of China'; 'General Gordon's Letters from the Crimea'; 'Armies of the Native States of India'; 'Central Asian Questions'; 'Lord William Bentinck'; 'Short History of China'; 'Life of Sir Stamford Raffles' (1897); 'The Congo State' (1898); 'The Belgians at Waterloo'; 'India in the 19th Century' (1901).

Boulger, Dorothy Henrietta (THEO. GIFT), English novelist: b. 30 May 1847. She is a daughter of Thomas Havers of Thelton Hall, Norfolk, and married George S. Boulger (q.v.), in 1879. She began to publish in 1871, and is the author of 'True to Her Trust,' 'Pretty Miss Bellew,' 'Maid Ellice,' 'A Matter-of-Fact Girl,' 'Visited on the Children,' 'Victims,' 'Lil Lorimer,' 'An Innocent Victim,' 'A Garden of Girls,' 'Not for the Night-time,' 'Dishonored,' 'Wrecked at the Outset,' 'An Island Princess,' 'Women Who Work,' 'Cape Town Dicky,' 'The Little Colonists,' 'Fairy Tales from the Far East,' 'The Case of a Man with His Wife.'

Boulger, George Simonds, English botanist: b. Blechingly, Surrey, 5 March 1853. He has been professor of botany and geology at City of London College from 1884 and has published 'Familiar Trees' (1886-9); 'The Uses of Plants' (1889); 'Biographical Index of British and Irish Botanists,' with Britten (1893); 'The Country, Month by Month,' with Owen (1894-5); 'Elementary Geology' (1896); 'Flowers of the Field' (1900); 'Wood' (1902).

Boulogne - sur - Mer, boo-lōn sür mār, France, a seaport of the department Pas de Calais, at the mouth and on the right bank of the River Liane, with the suburb of Capécure on the left. The town proper consists of an upper and lower town. The former is surrounded with old and well-planted ramparts; the latter, which is the business section, has straight and well-built streets and is semi-English in character, many of the signboards being in English, the shops having an English air, and much English being spoken. The Church of Notre Dame (begun in 1827, consecrated in 1866) has a magnificent high altar, and a crypt, part of which dates from the 12th century. Among the churches, some of which are handsome edifices, there are several for the English population. The castle, which dates

from 1231, is a massive structure, communicating with the upper town by a bridge. It serves at present as a barrack and artillery depot. Here Louis Napoleon was imprisoned in 1840. Other noteworthy buildings are the Hotel de Ville, the Palais de Justice, the large and handsome bathing establishment, the library of 50,000 volumes, the museum of natural history and antiquities, the custom-house, the exchange, etc. Boulogne carries on various industries, is one of the chief French seaports, and is a great fishing centre, giving employment to about 5,000 hands. Extensive improvements in its accommodation for shipping are being carried out or projected. There is a large passenger traffic between Boulogne and Folkestone. Steamboats run daily between this place and England. Boulogne still exhibits some Roman remains. The Northmen took it in 882 and massacred the inhabitants. In 1544 the town was taken by Henry VIII. of England after a siege of six weeks. The English retained it till 1550, when Edward VI. sold it to France for 400,000 crowns. The Emperor Charles V. demolished it in 1553. During the first republic Boulogne received the name of Port de l'Union. With a favorable wind, vessels can reach the coast of England in two or three hours from this place. Bonaparte, therefore, ordered the harbor to be made deeper, and a number of vessels to be built in order to transport the army intended for the invasion of England, and some small forts and batteries to be erected in order to strengthen the harbor and the town. A large army remained here for many months in a camp, which almost resembled a town, waiting to embark; but upon the breaking out of hostilities with Austria in 1805 they were called to other places. Pop. (1896) 46,807.

Boulogne-sur-Seine, sãn, France, a town in the department of the Seine, southwest of Paris, of which it is a suburb. It is from this place that the celebrated Bois de Boulogne gets its name. Pop. (1896) 36,984.

Boulton, Charles Arkoll, Canadian soldier and statesman: b. Coburg, 1841; d. 1899. He entered the British army in 1858 and served for 10 years. During the first Manitoba insurrection he fought against the rebels and was captured in 1870 and condemned to death; when the rebellion broke out the second time he commanded a corps organized by himself and known as the Boulton Scouts. He became a member of the Canadian Senate in 1889. He wrote 'Reminiscences of the Northwest Rebellion.'

Boulton, Matthew, English engineer: b. Birmingham, 3 Sept. 1728; d. Soho, 17 Aug. 1809. After being educated at a grammar school he was instructed in drawing by Worlidge, and he also studied mathematics. He engaged in business as a manufacturer of hardware, and as early as 1745 he is said to have invented and brought to great perfection inlaid steel buckles, buttons, watch-chains, etc., of which large quantities were exported to France, whence they were repurchased with avidity by the British as "the offspring of French ingenuity." In 1762 Boulton, finding his manufactory at Birmingham too confined for his purposes, purchased a lease of the Soho, about two miles distant, in the county of Stafford. This spot, then a barren heath, was gradually converted into an exten-

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sive manufactory and school of the mechanical arts, where ingenious men found ample employment for their talents from the liberal patronage of the proprietor. The introduction of that important machine, the steam-engine, at Soho, led to a connection between Boulton and James Watt, of Glasgow, who became partners in trade in 1769.

Bouncing Bet, or **Old Maid's Pink**, an old-time garden flower common as a weed. See SOAPWORT.

Bound Brook, N. J., a town of Somerset County, situated on the Raritan River and on the Baltimore & O., the Central N. J., the Lehigh Valley, and the Philadelphia & R. R.R.'s. It has a large lumber trade, and manufactures woolen goods, electric dynamos, paint, roofing-paper, etc. During the Revolutionary War it was the scene of a surprise of the American troops by Cornwallis. The Americans, being largely outnumbered, were forced to retreat after a short battle. Pop. (1900) 2,622.

Boundaries, American. English monarchs were very ignorant of American geography and were perpetually making grants irreconcilably and even grotesquely conflicting; as when the grants to New Hampshire and New York each included all of Vermont, and those "westward to the South Seas" included all the possible territory out of which later grants, often with the very same phraseology, were made. The Wyoming dispute between Connecticut and Pennsylvania, and the Western Reserve of the former in Ohio, are only samples of the endless wrangles occasioned by these royal gifts; and a considerable part of intercolonial history is the account of the struggles—by influence before the Privy Council, or by compromise or outright war among themselves—by which the present limits were gradually shaped. Short of this, much interesting history is involved in the surveys, from that of Mason and Dixon's Line down to that between Connecticut and Massachusetts, which rectified lines admitted in theory. After the Revolution, jurisdiction over boundaries was assumed by Congress, which, in 1781, under the Articles of Confederation, provided minutely for the selection of a court to determine such cases, modeled on the Grenville Act of 1770. The adoption of the Constitution in 1788 placed all such matters in the final determination of the supreme court. The boundaries between foreign powers and the United States as a whole present a different problem, or rather a series of problems; for which see: also ALASKA; ANNEXATIONS; CANADA; FLORIDA; GADSDEN TREATY; LOUISIANA PURCHASE; MEXICAN WAR; NORTHEAST BOUNDARY; TREATY OF VERSAILLES.

Bounty, a grant or benefaction from the government to those whose services directly or indirectly benefit it, and to whom, therefore, it desires to accord some recompense, or at least recognition. In law and commerce, it is a premium paid by a government to the producers, exporters, or importers of certain articles, or to those who employ ships in certain trades. This is done either with the view of fostering a new trade during its infancy, or of protecting an old one which is supposed to be of special importance to the country. In 1890 Congress passed an act providing for a premium to be paid to the producers of cane, beet, and sorghum sugar

by way of bounty. This bounty was in the nature of a contract (made with each and every person in the United States engaged in the cultivation of such varieties of sugar), providing that, in the event their produce attained a given standard of saccharine strength, they should receive the bounty provided therefor by the appropriation from the treasury. This act greatly stimulated the sugar-producing industry of the country, and large amounts of money have been invested, and a larger amount of sugar has been produced in the United States during the years that have followed the passage of the act than in any equal period in the history of the country. All bounties or premiums are not offered for the encouragement of domestic talent and industry to the exclusion of foreign competition. Many of those offered by the British and French governments, and by private associations, are held out to all competitors indiscriminately; and where the object is universal improvement, this is one of the appropriate modes of encouragement, though others concur with it, such as the monopolies of copyrights and patents, and the honors and distinctions conferred on those who make any important improvement. One other class of cases may, properly enough, be made the subjects of bounties or premiums; namely, the productions of extraordinary efforts of ingenuity and skill. A competition is in this way excited, by which none suffers, and all the effects of which are beneficial to a community.

Bounty, The. See BLIGH, WILLIAM.

Bounty-jumper, a term used during the Civil War in the United States to denote one who enlisted in the United States military service to secure the bounty paid by the government for volunteers, and then deserted. Some of these enterprising individuals carried on a regular business of enlisting in one place under a certain name, hurrying to the front, receiving the bounty, deserting at once upon its receipt, and reappearing in some other place under a different name, only to re-enlist and repeat the process. The risks were great, but as the bounty was, in some cases, quite large, the practice found many votaries.

Bounty Lands. By royal proclamation of 7 Oct. 1763, American colonial governors were prohibited from making land grants west of the sources of the rivers flowing from the west or northwest into the Atlantic. This was to quiet the apprehensions of the Indians in the Ohio region that their lands were to be granted out. But Lord Dunmore of Virginia was empowered to offer bounties in land to all officers and soldiers who had served in the French and Indian war, and should personally apply to him for warrants,—5,000 acres to each field officer, 3,000 to captains, 200 to subalterns or staff officers, and 50 to private soldiers,—up to 200,000 acres, from the king's domain either in Canada or Florida, or the "crown lands." This was understood by Americans to mean precisely the above western lands, and those who had the ability and foresight selected choice tracts beyond the Alleghanies provisionally in hope of the government validating them later. Washington, for example, by himself and his land agent Crawford, had surveyed 70,000 acres, and secured patents in his own and other officers' names for 63,000, of which his own share was

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32,000. Dunmore began giving these warrants on his own responsibility as early as July 1773, and on 21 Jan. 1774 notified all gentlemen, officers, and soldiers to have their surveyors assemble at the mouth of the Great Kanawha River and proceed to survey their claims. The land agents and surveyors who went down the river were stopped and in some cases attacked by the Indians; and this was one of the agencies in bringing about Dunmore's War (q.v.) although trouble had been gathering for a long period from white settlement and Indian murders. The name "bounty lands" has been defined as pertaining to the Northwest Territory lands belonging to the States, because on 16 Sept. 1776 Congress offered land bounties to volunteers in the Revolution (assessing the money to buy them on the several States, to which Maryland objected because the other States had lands and she had none, and so would be unfairly taxed); but it does not appear that the phrase was ever used of them at the time.

Bouquet, boo-kā, Henry, British officer in the French and Indian wars: b. Rolle, Switzerland, 1719; d. Pensacola, Fla., 23 Aug. 1765. He entered the army of the States-General of Holland, then served in the Sardinian army against France and Spain but returned to the Dutch service in 1748 as an officer of the Swiss Guards. When war broke out between France and England in 1755, Bouquet was made lieutenant-colonel of an English regiment known as the Royal Americans. He reached Philadelphia in 1756 and in 1757 was ordered to Charleston with a small detachment of his regiment; but in 1758 returned to Pennsylvania and was made second in command of an expedition against Fort Duquesne in which George Washington also took part. The French deserted and set fire to the fort before the expedition reached there. This gave the control of Pennsylvania to the English, but Bouquet remained in the province, mostly at outlying posts. In 1763 the Indians united in an attempt to expel the English; they massacred many settlers, coming within a few miles of Lancaster, and blockaded Fort Pitt. There was no time to raise provincial troops if the fort was to be saved, so Bouquet set out with a force of 500 regulars, made his way through the forest, taking every precaution against surprise, and defeated the Indians at Bushy Run within 20 miles of Fort Pitt. The number of the Indians that attacked him was as great as his own force, and his soldiers had never seen Indian warfare, but by skillfully feigning a retreat Bouquet drew the Indians from their cover and completely routed them by a sudden charge. In the following year he led a force of regulars and provincial troops to the forks of the Muskingum River, 150 miles west of Pittsburgh. The Indians, overawed by his former victory and by his boldness in penetrating so far into the wilderness, were ready to make peace and surrender their white prisoners. He was subsequently made brigadier-general and commandant of the Southern Colonies of British America and went to Pensacola, where he died.

Bouquet, Jean Claude, zhōn klōd, French mathematician: b. 1819; d. 1885. In 1865 he became professor of mathematics in the Faculté des Sciences of Lyons. He was then called to Paris, where he taught special mathematics at

the Bonaparte Lyceum, and subsequently at the Louis-le-Grand Lyceum. In 1873 he was appointed professor of mechanics at the Sorbonne, and was elected member of the Academy of Sciences in 1875 in the place of M. Bertrand. He also received the decoration of the Cross of the Legion of Honor.

Bouquet de la Grye, Jean Jacques Anatole, zhōn zhak ān-a-tōl boo-kā-dè-la-grē', French hydrographical engineer: b. Thiers, 20 May 1827. He became a member of the Institute; commander of the Legion of Honor, and a member of the Academy, elected in 1884. A project which he has long urged is to make Paris a seaport by means of a ship-canal up the Seine. He is also known as an inventor and improver of astronomical instruments. He has written 'Paris as a Seaport'; 'Notes on Soundings of the Sea'; 'A Hydrographic Study on the Bay of Rochelle,' etc.

Bouquet of Wine, a pleasant, non-spirituos aroma characteristic of good wines, and named on account of its real or fancied resemblance to the odor of flowers and fruits. The precise chemical nature of the substances that give rise to the "bouquet" is not known. They consist partly, without doubt, of a mixture of compound ethers, derived from fatty acids that are produced by the oxidation of albuminous substances and vegetable fats or oils. Essential oils of various kinds must also be included among them. According to some authorities, the kind of yeast that is used in the fermentation has much to do with the bouquet that is developed. Fruit blossoms are occasionally added to the must on account of the "ferment oil" that is developed by their fermentation, and which communicates a fruity smell to the wine. Elder flowers, when added to the must in this way, give rise to an aroma of Muscatel grapes, and the flowers of the vine itself, when used in the same manner, give a Rhine wine bouquet.

Bouquetin, boo-k'tān', a wild goat of the Alps and Pyrenees. See IBEX.

Bourbaki, Charles Denis Sauter, shārl dē-nē sō-tā boor-ba-ke, French general: b. Pau, 22 April 1816; d. Bayonne, 22 Sept. 1897. He entered the army in 1836, and fought in the Crimea and Italy. In 1870 he commanded the Imperial Guard at Metz, whence he was sent to England, on a secret mission to the empress. Under Gambetta he organized the Army of the North, and commanded the Army of the Loire. His attempt to break the Prussian line at Belfort, though ably conceived, ended in disastrous failure; in a series of desultory attacks on a much inferior force, 15-17 Jan. 1871, he lost 10,000 men. In the wretched retreat to Switzerland that followed on the 27th, reduced to despair by the ill success of his plans, he attempted to commit suicide. From 1873 to 1879, he commanded the 14th Army Corps at Lyons, and in 1881 he retired from active service.

Bourbon, Antoine de, ān-twān dē, Duke of Vendôme, and afterward king of Navarre: b. 22 April 1518; d. 17 Nov. 1562. He married, in 1548, Jeanne d'Albret, only child of Henry II., king of Navarre, and assumed the title of king in her right. After the accession to the throne of France of the young king Francis II., he

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endeavored to obtain the control of the affairs of that country, but failed, through his want of energy and perseverance. On the death of Francis II., in 1560, he was made lieutenant-general of the kingdom, and adviser to the queen mother (Catherine de Medici) during the minority of her son. Upon the breaking out of the civil war, in 1562, he commanded the royal forces, and died of a wound received at the siege of Rouen. His son, Henry of Navarre, became king of France, as Henry IV. (1594).

Bourbon, Charles, shārl (DUKE OF BOURBONNAIS), French general, known as CONSTABLE DE BOURBON; son of Gilbert, Count of Montpensier, and Clara of Gonzaga: b. 1489; d. 6 May 1527. He received from Francis I., in the 26th year of his age, the sword of Constable. By the coolness with which he faced death in posts of the greatest hazard he excited the admiration of his fellow-soldiers. When viceroy of Milan he won all hearts by his frankness and affability. His fame was not yet tarnished when the injustice of his king deprived him of his offices, banished him from France, and brought the family of Bourbon into disgrace, in which state it continued until the conclusion of the reign of Henry III. Some historians declare that the Duchess of Angoulême, mother of Francis I., had fallen in love with the young constable, and could not endure the contempt with which he treated her passion: others relate that, influenced by avaricious motives, she laid claim to the estates of Charles of Bourbon, and obtained possession of them by a judicial process. Whatever may be the true cause of her conduct, it is certain that she strove to invalidate a formal donation of Louis XII. The constable, enraged at seeing himself deprived of his estates by the mother of the king whom he had served with so much fidelity and zeal, listened to proposals made him by Charles V. and the king of England. He experienced the usual fate of deserters: he was well received while his services were needed, but narrowly watched to secure his fidelity. Exposed as he was to the contempt of the Spanish nobility and the jealousy of the generals of Charles V., nothing remained to him but his courage and repentance. His ability, however, induced the emperor to bestow upon him the command of an army, and to treat him with honor. He was already beyond the confines of France, when Francis I. sent to demand the sword which he bore as constable, and the badge of his order. His answer displays the anguish of his heart: — "The king took from me my sword at Valenciennes, when he gave to D'Alençon the command of the vanguard, which belonged to me: the badge of my order I left under my pillow at Chantelles." His flight was a misfortune to France; the expedition of Francis into Italy was arrested. Having been appointed to the command of the imperial troops, he made an unsuccessful attack upon Marseilles, but contributed greatly to the victory of Pavia. When Francis was carried a prisoner to Madrid he went there in person, that he might not be forgotten in the treaties between the two monarchs; but Charles V. delayed concluding them, and Bourbon discovered that he could not trust the emperor, who had even promised him his sister in marriage. Compelled to smother his resentment he returned to Milan, maintained possession of Italy by the terror of

his arms, and obtained so much authority as to become an object of suspicion to the emperor, who, in order to weaken him, refused to grant him the necessary supplies. In order to prevent the dispersion of his army he led the soldiers to the siege of Rome, the plunder of which city he promised them. He was the first to mount the breach, and was killed by a ball, shot, it is said, by Benvenuto Cellini. His body being conveyed to Gaeta, his soldiers erected over it a splendid monument, afterward destroyed. See Coignet: 'Francis the First and His Times' (1888).

Bourbon, Charles (CARDINAL), French prince and prelate; brother of Antoine de Bourbon; uncle to Henry IV., king of France: b. 1520; d. Fontenay-le-Comte, 1590. He was archbishop of Rouen, legate of Avignon, cardinal, peer of France, and member of the Council. In spite of family ties he ardently supported the Guises and the League, and was declared by that faction heir presumptive to the throne on the ground that his brother, Antoine, through heresy, had forfeited his claim. On the death of Henry III. he was declared king, as Charles X., and was recognized by a majority of the *parlements*, though he was all the while a prisoner at Fontenay-le-Comte.

Bourbon, Louis, loo-e, Spanish prelate: b. 1777; d. 19 March 1823. He was the son of the infant Louis, brother of King Charles III. of Spain, and the Duchess of Chinchon. The marriage was concluded with the royal assent: nevertheless, it was doubted, after the death of Charles III., whether the prince would be lawful heir to the throne, if a male descendant of the old line should be wanting. He therefore entered the Church, was appointed archbishop of Seville in 1799, and of Toledo in 1800. A cardinal's hat was also given to him in 1800. After the imprisonment of Ferdinand VII. at Valençay, he joined the party of the Cortes, and became very influential. He offered, in 1814, the constitution of the Cortes to Ferdinand VII. for his signature; and the king having altered his determination, Bourbon lost his favor and was deprived of the archbishopric of Seville. After the events which took place on the insurrection of the army at the island of Leon, he engaged in the revolution, and was president of the provisional junta before which the king swore, at Madrid, 9 March 1820, to abide by the constitution of the Cortes of 1812.

Bourbon, Louis Henri, loo-e ðñ-re (DUC DE), French courtier, Prince of Condé: b. Versailles, 1692; d. Chantilly, 27 Jan. 1740. As chief of the Council of Regency and superintendent of the king's education, he robbed the public treasury and extorted huge bribes. Made prime minister in 1723, he persecuted the Protestants, and granted exorbitant privileges to the India Company, in which he held shares. He was entirely controlled by his mistress, the Marquise de Prie.

Bourbon (boor-bôn) Family. The founder of this family, which has governed France, Spain, the two Sicilies, Lucca, and Parma, was Robert the Strong, who, in 861, became Duke of Neustria, and in 866 lost his life in a battle against the Normans. Some trace his descent from Pepin l'Heristal, others from a natural son of Charlemagne, and others from the kings of Lombardy. It is certain that the two sons of this Robert were kings of France. The elder,

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named Eudes, ascended the throne in 888, and died in 898; the younger, Robert, in 922, and died in 923. The eldest son of this Robert was Hugh the Great, Duke of the Isle of France, and count of Paris and Orleans. Hugh Capet, son of Hugh the Great (great grandson of Robert the Strong), founded the third French dynasty in 987. One of his descendants, named Robert, was the root of the elder line of the dukes of Burgundy, which became extinct in 1361. A descendant of this Robert, Henry of Burgundy, was first regent of Portugal in 1095, where his legitimate descendants became extinct in 1383. Pierre de Courtenay, a descendant of Hugh Capet, in the fifth generation, was father and ancestor of many emperors of Constantinople. The house of Anjou descended from Hugh Capet, in the eighth generation, possessed the throne of Naples for two centuries, and for some time that of Hungary. Another descendant of Hugh Capet, in the 10th degree, founded the house of Navarre, which continued from 1328 to 1425. A second family of Anjou, descended from Hugh Capet, in the 13th degree, gave some distinguished princes to Provence. In the same degree, the younger line of the powerful dukes of Burgundy derived its origin from him. This line became extinct with the death of Charles the Bold, in 1477, whose successor, Maria, married Maximilian, archduke of Austria, and became grandmother of Charles V. Robert, Earl of Clermont, second son of St. Louis, married Beatrice, Duchess of Bourbon. In this way the city of Bourbon l'Archambault, or Bourbon les Bains, in the department of Allier (formerly Bourbonnais), became the birthplace of the house of Bourbon, and Louis I., Duke of Bourbon, son of Robert and Beatrice, its founder. Two branches took their origin from the two sons of this Louis, Duke of Bourbon, who died in 1341. The elder line was that of the dukes of Bourbon, which became extinct at the death of the Constable of Bourbon in 1527, in the assault of the city of Rome. The younger was that of the counts of La Marche, afterward counts and dukes of Vendôme. Of these, Charles, Duke of Vendôme, who died in 1537, and who had been the head of the house of Bourbon since the death of the Constable, had two sons, Anthony and Louis, founders respectively of the royal line of Bourbon, and of the line of Condé. Henry, the son of Anthony, obtained the throne of France as Henry IV., when the house of Valois became extinct in 1589 by the murder of Henry III. His father had obtained the kingdom of Navarre through his wife, who inherited it, and Henry now added it to the French dominions. Anthony's younger brother Louis, Prince of Condé, was the founder of the line of Condé. There were, therefore, two chief branches of the Bourbons—the royal, and that of Condé. The royal branch was divided by the two sons of Louis XIII., the elder of whom, Louis XIV., continued the chief branch, which, through his son, Louis (the dauphin), and grandson, Philip V., was separated into the elder or royal French branch, and the younger or royal Spanish branch; while Philip, younger son of Louis XIII., founded the house of Orleans, when he received the duchy of Orleans from Louis XIV. The kings of the elder or French line of the house of Bourbon are as follows: Henry IV., Louis XIII., XIV., XV., XVI., XVII., XVIII., and Charles X. The

house of Bourbon consists of the following branches and members:

A. *The Elder French Royal Line of Bourbons as Distinguished from the Younger Branch or House of Orleans.* The last sovereigns of this line were three brothers, Louis XVI., Louis XVIII., and Charles X. (Louis XVII., son of Louis XVI., never obtained the crown), all of whom were grandsons of Louis XV. Louis XVIII. had no children, but Charles X. had two sons, namely: Louis Antoine de Bourbon, Duke of Angoulême, who was dauphin till the revolution of 1830, and died without issue in 1844, and Charles Ferdinand, Duke of Berry, who died 14 Feb. 1820, of a wound given him by a political fanatic. The Duke of Berry had two children, (1) Louise Marie Thérèse, called Mademoiselle d'Artois, and afterward by marriage Duchess of Parma, died at Venice, 1 Feb. 1864; and (2) Henri Charles Ferdinand Marie Dieudonné, born in 1820, and at first called Duke of Bordeaux, but afterward Count de Chambord. His mother was the Princess Caroline, daughter of Francis I., king of the two Sicilies. Charles X., having abdicated in favor of his grandson Henri above mentioned in 1830, and the dauphin having renounced his claims on the French throne also in favor of the latter, the Count de Chambord was until his death looked upon by his party as the legitimate heir to the crown of France, and was styled by them Henri V.

B. *The Branch of the Bourbons Known as the House of Orleans.*—This branch raised to the throne of France by the revolution of 1830, and deprived of it by that of 1848, derives its origin, as already mentioned, from Duke Philip I. of Orleans (d. 1701), second son of Louis XIII. and only brother of Louis XIV. By his second wife, Charlotte of the Palatinate, he left as his successor in the dukedom his son Philip, known as Duke of Chartres during his father's lifetime, and was regent of France during the minority of Louis XV. Philip, second Duke, was succeeded by his son, Louis Philip (b. 1703), who married a princess of Baden, and died in retirement in 1752, leaving a son of the same name. Louis Philip, Duke of Orleans, who was born in 1725, and died in 1785. The son of the last-mentioned Duke was Louis Joseph Philip, the Duke of Orleans whose name figures in the first French Revolution, who perished on the scaffold in 1793, after he had laid aside his princely name the year before and assumed that of "Citizen Egalité." He left four children: (1) Louis Philip, before the Revolution Duke of Chartres, after his father's death Duke of Orleans, from 1830 to 1848 king of France, died 26 Aug. 1850, leaving a numerous family; (2) the Duke of Montpensier, who died in England in 1807; (3) the Count de Beaujolais, who died at Malta in 1808; and (4) a daughter, Adelaide, Mademoiselle d'Orleans, born in 1777, died 31 Dec. 1847. The eldest son of King Louis Philip was Ferdinand, Duke of Orleans (b. 1810, d. 1842), who married a daughter of Frederick Louis of Mecklenburg-Schwerin, and left two sons: (1) Louis Philip, Count de Paris, b. Paris, 24 Aug. 1838; and (2) Robert, Duke of Chartres, b. Paris, 1840. Louis Philip having abdicated in favor of the former in 1848, the Count de Paris till his death in 1894 was looked upon by the Orleanists as the true heir to the throne. He was married to his cousin, Isabella, a daughter of the Duke of Montpensier, and left issue.

C. The Spanish-Bourbon Dynasty.—In 1700 Louis XIV. placed his grandson Philip, Duke of Anjou, on the Spanish throne, who as Philip V. founded the Bourbon dynasty in Spain. Philip V. was succeeded in 1746 by his son, Ferdinand VI., who, dying in 1759 without heirs, was succeeded by his brother, Charles III. To him succeeded (1788) his son Charles IV., who, in 1808, resigned the throne in favor of a successor nominated by Napoleon, and died at Naples in 1819. His son Fernando, Prince of the Asturias, obtained the crown on the fall of Napoleon, and reigned as Ferdinand VII., dying 29 Sept. 1833, and leaving behind him two daughters by his third marriage, the elder of whom succeeded him as Isabella II. She was married, in 1840, to her cousin Francisco de Assis. In 1868 she had to leave Spain in consequence of the revolution, and in 1870 she renounced her claims to the throne in favor of her son Alphonso, who became Alphonso XII., and died in 1885, his son, Alphonso XIII., succeeding him.

D. The Royal Line of the Two Sicilies.—The Two Sicilies being then a possession of the Spanish monarchy, in 1735 Don Carlos, the younger son of Philip V. of Spain, obtained the crown and reigned over Sicily and Naples as Charles III. In 1759, however, he succeeded his brother Ferdinand VI. on the Spanish throne, when he transferred the Two Sicilies to his third son Fernando (Ferdinand IV.), on the express condition that this crown should not be again united with Spain. Ferdinand IV. had to leave Naples in 1806; but after the fall of Napoleon he again became king of both Sicilies under the title of Ferdinand I. He was succeeded by his son Francis I in 1825; Francis was succeeded by his son Ferdinand II. in 1830; and the latter was succeeded by his son Francis II. in 1859, who was deprived of the kingdom in 1860.

E. The Ducal Line of Parma.—This line, like that of the Two Sicilies, was founded by a son of Philip V. of Spain, namely: Don Philip, his youngest son, who obtained the duchies of Parma and Piacenza in 1748. Louis, grandson of Don Philip, obtained Tuscany likewise (1802), with the title of king of Etruria. The family did not long retain this honor, however, being soon forced by the power of France to give up not only Etruria, but also Parma and Piacenza; and it was not till 1847 that there was again a Bourbon Duke of Parma. In 1859 the reigning Duke, Robert, had to leave his dominions, which were soon incorporated in the kingdom of Italy. See Coiffier Demoret, 'Histoire du Bourbonnais et des Bourbons' (1824); Achaintre, 'Histoire Chronologique et Généalogique de la Maison Royale de Bourbon' (1825); Coxe, 'Memoirs of the Kings of Spain of the House of Bourbon' (1815); Lehes, 'Généalogie des Bourbons de France, d'Espagne, de Naples, et de Parme' (1880); Bingham, 'The Marriages of the Bourbons' (1890).

Bourbon, Isle of. See RÉUNION, ISLE DE LA.

Bourbon-Lancy, län-se, a French watering place, département Saône-et-Loire, famous for its thermal springs, containing chloride of sodium and iron. Its situation is notably fine, and by the Romans it was called Aquæ Nisinei or Nisienses. Remains of the Roman baths are still to be seen here, and the town contains a hospital, built by the Marquis d'Aligre, with 400 beds. Pop. (1896) 4,162.

Bourbon-Vendée, vön-dä, **Napoléon-Vendée,** or, since the dissolution of the Second Empire in 1870, **La Roche-sur-Yon,** a town in France, the capital of the département Vendée, 231 miles southwest from Paris, situated on a hill on the right bank of the Yon. The streets nearly all end in a spacious square, bordered with ranges of fine trees, and surrounded by public monuments and elegant mansions. The parish church, with a peristyle of six Doric columns, and the mairie or mansion-house, an elegant Italian building, are both in the square. Besides these there are an elegant market-house, theatre, and extensive public offices, large barracks, and a small public library. There is an active trade in woolen cloth, and hardware. It was founded by Napoleon I. on the site of the ancient castle of Roche-sur-Yon, destroyed at the Revolution, and received the name of Napoléon-Vendée, which was changed to Bourbon-Vendée at the Restoration. Pop. (1891) 12,215.

Bourbon Whisky, a term applied to Kentucky whisky, made from a mixture of corn, rye, and malt, of which the corn constitutes the larger part. In its distillation some of the oils and acids are allowed to remain. These, with age, undergo chemical action, and are converted into aromatic ethers.

Bourbonnais, a province and government of old France, with the title, first of a county, and afterward of a duchy, lying between the Nivernais, Berry, and Burgundy. It now forms the department of the Allier. It derived its name from the small town Bourbon l'Archambault, from which the Bourbon family received their title. Consult Montegut, 'En Bourbonnais et en Forez' (1880).

Bourbonnais, boor-bön-nä, Ill., a village in Kaskaskia County, 56 miles south of Chicago, the seat of two important Roman Catholic schools, Notre Dame Academy, and Saint Viator's College, opened in 1865. Pop. 595.

Bourbonne-les-Bains, boor-bün-lä-bän, a town of France, département of Haute Marne, 21 miles east-northeast of Langres, with hot springs, which were resorted to by the Romans. They contain much chloride of sodium, with a temperature which varies from 140° to 150° F., and frequented by some 3,000 invalids annually. The town has a 12th century church, a large military hospital, and interesting ruins of an ancient château. Pop. (1896) 4,156.

Bourboule, boor-bool, La, French health resort in the département of Puy-le-Dôme, 22 miles southwest of Clermont. It is picturesquely situated amid striking scenery and its mineral thermal springs are visited by over 7,000 persons yearly. Its waters when bottled are extensively exported for medicinal use. Pop. 1,947.

Bourchier, boor'chî-ër, **Arthur,** English actor: b. Speen, Berkshire, 22 June 1864. He was educated at Oxford where he was prominent in amateur theatricals and in 1889 went upon the stage. He has played in leading theatres in England and the United States and took the Royalty Theatre in 1895 when he brought out one of his own adaptations, 'The Chili Widow,' which ran 300 nights, and the Garrick Theatre in 1900, where he produced Barrie's play, 'The Wedding Guest.'

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Bourdaloue, Louis, loo-ə boor-da-loo, the founder of genuine pulpit eloquence in France: b. Bourges, 20 Aug. 1632; d. Paris, 13 May 1704. He was sixteen when he entered the society of Jesuits and his instructors successively entrusted to him the chairs of polite letters, rhetoric, philosophy, and moral theology. In 1669 he entered the pulpit, and extended his reputation by attacking, with a powerful and religious eloquence, free from the bad taste of the age, the passions, vices, and errors of mankind. The dignity of his delivery, and the fire of his language, made him distinguished, amidst the victories of Turenne and the feasts of Versailles, among the master-spirits of the arts and of literature in the time of Corneille and Racine. Louis XIV. invited him, in 1670, to preach before the court, and Bourdaloue acquitted himself with so much success that he afterward received invitations at 10 different times. After the repeal of the Edict of Nantes, he was sent to Languedoc, in order to explain to the Protestants the doctrines of the Roman Catholic faith, and he succeeded in this difficult business in reconciling the dignity of his office with the rights of mankind. In his latter days he devoted himself to the care of hospitals, prisons, and religious institutions. He well knew how to accommodate his manner to the capacity of those to whom he gave instruction, advice, or consolation. With the simple, he was simple; with the learned, he was a scholar; with free-thinkers, he was a logician; and came off successful in all those contests in which the love of his neighbor, religious zeal, and the duties of his office, involved him. Beloved alike by all, he exercised authority over the minds of all; and no consideration could make him give up his openness and integrity of character. His 'Sermons and Moral Discourses' appeared in English (3d ed. 1855); and 'Married Life: Its Obligations and Trials' (1897). See Fèngère, 'Bourdaloue, sa prédication et son temps' (1874); Tousserat, 'Etude généalogique sur les Bourdaloue' (1900).

Bourdillon, Francis William, English poet: b. 22 March 1852. He has taught private pupils for many years and as a poet is widely known as the author of the lyric, 'The Night Has a Thousand Eyes.' His published works include 'Among the Flowers' (1878); 'Aucasin and Nicolette' edited and translated (1887); 'Ailes d'Alouette' (1890); 'A Lost God' (1891); 'Sursum Corda'; 'Nephele,' a much admired musical romance (1896); 'Minuscula' (1897).

Bourdon, Sébastien, sā-bās-te-ōñ boor-dōñ, celebrated French painter: b. Montpellier, 1616; d. 1671. Being poor and without occupation, he enlisted as a soldier. After receiving his dismissal, he visited Italy, and studied under Poussin and Claude Lorraine. In 1652 he was driven from the French kingdom by the religious troubles, when he was appointed first painter to Queen Christina of Sweden. He afterward became distinguished in his own country by many great works, among which are the following: the 'Dead Christ,' the 'Old Kings of Burgundy in the Senate-house at Aix,' the 'Adulteress.' He had no peculiar manner, but he imitated others. He was a good engraver on copper. He died while engaged in painting the ceiling of the Tuileries.

Bourdon, named after the inventor, a barometer consisting of an elastic flattened tube of metal bent to a circular form and exhausted of air, so that the ends of the tube separate as the atmospheric pressure is diminished, and approach as it increases. The Bourdon is commonly known as the metallic barometer, although the aneroid is also metallic, and both holosteric.

Bourdon de L'Oise, François Louis, frañswā loo-e boor-dōñ-dé-lwāz, French revolutionist: b. Saint Remy, about 1750; d. Cayenne, Guiana, after 1797. He figured in the attack on the Tuileries, 10 Aug. 1792, and did much to bring to pass the execution of the king and the fall of the Girondists, but from July 1794, adopted the side of the nobles and clergy. After joining a Royalist club he was proscribed and transported to Cayenne in 1797, where he died not long after.

Bourg-en-Bresse, boorg-āñ-brēs, a town of France, capital of the department of Ain, situated 232 miles southeast of Paris, on the Reysouse and the Cône. It is well built, and ornamented with public fountains, one of which was erected to the memory of Gen. Joubert. On the Promenade du Bastion is a bronze statue of Bichat, the celebrated anatomist, who pursued his early medical studies in the hospital here. The parish church of Bourg-en-Bresse is a handsome edifice of the 16th century. Outside the town is a magnificent hospital, surrounded by gardens; and the beautiful Gothic church of Brou, built by the direction of Margaret of Austria, daughter of Maximilian I. In front of the portal stands a curious elliptical sun-dial, reconstructed by the celebrated astronomer Lalande, who was a native of this place. Bourg-en-Bresse has a library, a museum, a lyceum, seminary, two hospitals, a lunatic asylum, some manufactories of linen and hosiery, tanneries, a cotton-mill, grain market, etc. Its trade in grain, cattle, horses, and wine is considerable. Pop. (1896) 18,501.

Bourgelat, Claude, klōd boorz'h'la, French lawyer, founder of the veterinary schools and creator of the art of veterinary surgery in France: b. Lyons, 1712; d. 3 Jan. 1779. He established the first veterinary school in his native town in 1762, and by his works on the veterinary art furnished the world with a complete course of instruction both in its theory and in its practice; they include 'Eléments d'Hippiatrique, ou Nouveaux Principes sur la Connaissance et sur la Médecine des Chevaux' (1750-3); and 'Traité de la Conformation Extérieure du Cheval' (1776).

Bourgeois, Charles Arthur, Baron, shārl ār-tür boor-zhwā, French sculptor: b. 1838; d. 1886. He was a student of Duret and M. Guillaume. Among the more notable of his works are the 'Arab Washerwoman'; and the 'Greek Actor,' in bronze; 'St. Agatha'; 'The Slave'; and 'Hero and Leander,' in plaster; 'The Delphic Pythos' and several busts in marble, and 'St. Joachim' and 'Religion,' two stone figures for the church of St. Eustache and the Church of the Sorbonne, respectively.

Bourgeois, Leon Victor Auguste, lā-ōñ vĕk-tōr ā-goost, French politician: b. Paris, 1851. After holding several positions of importance he became director of the ministry of the

interior in 1886 and in 1887 prefect of police. He was minister of the interior in 1889; minister of public instruction 1892-3 and prime minister 1895-6. He was for a time in 1898 minister of public instruction for the second time, and in 1899 was at the head of the French delegation to the peace conference at The Hague. He has written 'Solidarité' (1897).

Bourgeois, Sir Peter Francis, English painter: b. London, 1756; d. 8 Jan. 1811. At first intended for a military career, he soon determined to become an artist. In 1776 he went on a tour through France, Holland, and Italy, and three years later he exhibited his first picture. Elected A.R.A. in 1787, he became R.A. in 1793, and landscape painter to George III. in 1794. King Stanislaus of Poland in 1791 appointed him his painter and conferred on him the honor of knighthood, and shortly afterward George III. also knighted him. He bequeathed many pictures and a considerable sum of money to Dulwich College.

Bourgeois, bür-jois', a size of printing type larger than brevier and smaller than long primer, used in books and newspapers.

Bourgeoisie, boor-zhwä-zé, a name applied in France to citizens of towns who do not belong to the nobility or clergy, and in a narrower sense to townspeople occupying an independent position—merchants, tradesmen, independent artisans, lawyers, etc. In the early period of the Middle Ages this class was much oppressed, and as a consequence of that it was poor and possessed little culture and refinement. In subsequent centuries it succeeded in raising itself in all these respects, and latterly attaining a position of political equality with the nobility and clergy, came to be spoken of as the "third estate" (*tiers état*). The word is now used in a somewhat vaguer sense than formerly, and may be taken to correspond with the equally vague English appellation the "middle classes."

Bourges, boorz, France, capital of the department of Cher, 124 miles south of Paris, on the canal of Berry and the Central railroad, in an extensive plain, at the confluence of the Auron and the Yèvre. When the Romans invaded Gaul, it was known as Avaricum, the capital of Bituriges Cubi. It was taken by Cæsar, 52 B.C., and almost all its inhabitants slaughtered. Under the name of Bituriges, it was for 475 years the metropolis of Aquitania. During the Middle Ages, many councils were held here. The French clergy assembled here in 1438 to receive the famous charter known as the Pragmatic Sanction, by which the liberties of the Gallican church were secured. Jacques Cœur and Louis XI. were both born here. The former established here in 1463 a university, where Cujas taught during the 16th century. Bourdaloue, the famous preacher, was born here in 1632. Don Carlos resided here from 1839 to 1845, when he signed the abdication in favor of his son. The trial of Louis Blanc, Albert, and others, took place before the supreme court at Bourges, 7 March to 2 April 1849. The city is partly surrounded by a thick wall, flanked with lofty towers; its streets are irregularly laid out, while the houses are generally mean-looking, with their gables to the street. Among the old buildings which it contains are the magnificent cathedral, larger than Notre Dame de Paris,

and one of the finest Gothic monuments of Europe; the city hall, built at great cost by Jacques Cœur as a dwelling-house, and now occupied as the Palais de Justice; and the palace of the archbishop. The establishments of public instruction, including the imperial college, the theological seminary, and the normal school, are well patronized. Bourges has manufactories of fine and coarse cloths, iron foundries, and tanneries. Pop. (1896) 43,587.

Bourget, Paul, pöl boor-zhā, French novelist: b. Amiens, 2 Sept. 1852. After a brilliant course at the Lyceum of Clermont-Ferrand, where his father was professor of mathematics, and the College of Sainte Barbe, he graduated with high honors in 1872. He began to write in 1873, but it was 10 years before he found his true work, though he contributed, the while, numerous articles to the magazines, and published three volumes of striking verse, 'La Vie Inquiète' (1875); 'Edel' (1878); and 'Les Aveux' (1881). His 'Essais' (1883) was the first indication of his strength. The second series, 'Nouveaux Essais de Psychologie Contemporaine' (1886), was a singularly subtle and exceedingly searching inquiry into the causes of the pessimism then widely prevalent in France. Bourget's first novel, 'L'Irréparable' (1884), was followed by 'Cruelle Enigme' (1885); 'Un Crime d'Amour' (1886); 'André Cornélis' (1887), and 'Mensonges' (1887). The keen insight into the hidden springs of human motive, and the marvelous subtlety of psychological analysis of these stories, together with their clearness and refinement of style, have lifted Bourget into the front rank of contemporary French novelists. His intimate knowledge of English and Italian life, and his travels in Spain and Morocco, gave him the material for 'Sensations d'Italie' (1891); and 'Cosmopolis' (1892); and he recorded his impressions (1894) of travel in the United States. Other novels are 'Le Disciple,' 'Notre Cœur,' 'La Terre Promise,' 'Un Saint,' 'Antigone,' 'Drame de famille' (1900); 'Un homme d'Affaires' (1901); 'La fantôme' (1901). Bourget was admitted to the Academy in 1894.

Bourgoin, Edmé Alfred, ăd-mā ăl-frā boor-gwān, French chemist: b. Saint Cyr-les-Colonne, 1836. In 1867 he became chief pharmacist of the Children's Hospital in Paris and has been director of the central pharmacy of the Paris hospitals from 1885. Among his writings are 'Electro-chimie' (1868); 'Chimie organique. Principes de la classification des substances' (1876); 'Traité de Pharmacie galénique' (1880).

Bourgoin, a French town, capital of a canton in the department Isère in southeastern France. It is situated on the River Bourbre and was called by the Romans Bergusium. It contains important paper, linen, and woolen industries. Pop. (1901) 7,279.

Bourgoing, Jean François, zhōn fran-swā boor-gwan, French diplomatist: b. Nevers, 20 Nov. 1748; d. Carlsbad, 20 July 1811. While at a military school in Paris his talents were so marked that he was educated by the government at the University of Strassburg for the diplomatic service. After four years spent in Germany on diplomatic missions he went to Madrid in 1777 and was secretary of legation there

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seven years, writing in that time his noted 'Nouveau voyage en Espagne, ou Tableau de l'état actuel de cette monarchie' (1789). In 1791 he was minister plenipotentiary to Spain, minister to Saxony in 1808, and was at various times employed on diplomatic missions to Germany and Holland. Besides the work above named he wrote 'Mémoires historiques et philosophiques sur Pie VI.' (1789).

Bourignon, Antoinette, äñ-twän-ët boo-rë-nyôn, Flemish visionary: b. Lille, 13 Jan. 1616; d. Franeker, 30 Oct. 1680. She was born so ugly that her parents held a consultation to determine whether it would not be better to destroy her as a monster. She was spared, but her infancy was spent in neglect and solitude. The first books she put her hands on were lives of early Christians and mystical tracts, which she read eagerly. She entered a convent and was subsequently in charge of a hospital at Lille, but was obliged to leave on account of her religious vagaries. She held that religion consists in internal emotion and is independent of knowledge or practice. Her views were adopted by large numbers of Protestants and Roman Catholics, and in the 17th and 18th centuries Scottish Presbyterian ministers were for a long time compelled to renounce Bourignianism at their ordination. Among her works are 'Treatise of Solid Virtue' (1699); 'The Light of the World' (1696, in English 1863); 'Restoration of the Gospel Spirit' (1707).

Bourinot, boo're-nôt, Sir John George, Canadian publicist: b. Sydney, Nova Scotia, 24 Oct. 1838; d. 14 Oct. 1902. He was educated at Trinity College, Toronto; founded and edited the *Halifax Reporter*, became clerk of the Dominion parliament in 1880; was created a member of the Order of St. Michael and St. George in 1890; and in 1892 became president of the Royal Society of Canada. His publications include 'The Intellectual Development of the Canadian People' (1880); 'Manual of Constitutional History' (1888); 'Parliamentary Government in Canada' (1892); 'Parliamentary Procedure and Practice' (1884); 'How Canada is Governed' (1895); 'Canada's Intellectual Strength and Weakness' (1893); 'Canada Under British Rule' (1900); 'Cape Breton and Its Memorials of the French Régime' (1892).

Bourke, John Gregory, American military officer: b. Philadelphia, Pa., 23 June 1846; d. 8 June 1896. He was graduated at West Point in 1869, and saw much service against the Indians, rising through various grades to the rank of major. He became an expert in American ethnological lore; was a past president of the American Folk-lore Society, and wrote 'Snake Dance of the Moquis,' 'Medicine Men of the Apaches,' and other books. He distinguished himself on the Mexican border. He was an officer of great courage and ability.

Bourmont, Louis Auguste Victor, loo-ë â-goost vëk-tor boor-môn, (DE CHAISNES COMTE DE), marshal of France: b. 2 Sept. 1773, at the castle of Bourmont in Anjou; d. there 27 Oct. 1846. At an early age he took part in the campaign in La Vendée, at a later period entered the Republican army, and was advanced by Napoleon, under whom he had distinguished himself at Dresden and Nogent, to the rank of general of division. Although he had gone over

to the Bourbons in March 1814, Napoleon, on his return from Elba, gave him a command, which, however, Bourmont resigned before the battle of Ligny, in order to go over to the side of the allies. Some years after, as commander of the army of intervention in Spain, he obtained some brilliant successes. His greatest victory was the conquest of 'Algiers, which procured him a marshal's staff in 1830. After the revolution of July 1830, he followed the banished dynasty into exile. In 1833 Dom Miguel, king of Portugal, placed him at the head of his troops which were to act against the adherents of Dom Pedro; but he was unsuccessful. He afterward sought to act in the interests of the Carlists in Spain, and when he at last returned to his native country found that he had almost entirely lost his popularity, and accordingly retired for the rest of his life to his estate in Anjou.

Bourne, Edward Gaylord, American educator: b. Strykersville, N. J., 24 June 1860. He was graduated at Yale in 1883, and has been professor of history there since 1895. He has written 'The History of Surplus Revenue'; is one of the editors of the 'Yale Review'; and published a collection of his writings on historical subjects under the title of 'Essays in Historical Criticism.'

Bourne, George, American clergyman and anti-slavery writer: b. Westbury, Wiltshire, England, 1780; d. in the United States in 1845. In 1804 he settled at Harrisburg, Pa., where he set up a printing office. He was an earnest advocate of the total and immediate abolition of slavery, a position which aroused considerable opposition to him, and in 1815 he formed a church composed of non-slaveholders. His ultra-radical views at last obliged him to remove to Germantown. Afterward he resided for intervals at Sing Sing, N. Y., Quebec, and New York, where he founded a paper, *The Protestant Vindicator*. He wrote: 'The Book and Slavery Irreconcilable' (1815); 'Lectures on Ecclesiastical History' (1822); 'Pictures of Quebec' (1830); 'Slavery Illustrated in Its Effects upon Women' (1834).

Bourne, Hugh, founder of the sect of Primitive Methodists in England: b. Fordhays, Staffordshire, 3 April 1771; d. Bemersley, Staffordshire, 11 Oct. 1852. About 1810, some of the Wesleyan Methodists were desirous of renewing the primitive form of worship and constitution, and wished particularly to revive camp meetings. These practices were considered unadvisable, and accordingly Mr. Bourne and his friends were expelled from the body. They were 20 in number, and Hugh Bourne was acknowledged their elder. The name of Primitive Methodists was adopted in 1812, but by their opponents they were long styled "Ranters." The sect is now a powerful body in England, numbering in 1901, 108,874 members and 1,100 ministers. In the United States it has 74 ministers, 90 churches and 6,549 members. In 1844 Bourne visited the United States, where his preaching excited much attention. He published a 'History of the Primitive Methodists' (1823).

Bourne, Vincent, English scholar, distinguished for the beauty of his Latin poems: b. 1695; d. 2 Dec. 1747. In 1710 he became a

king's scholar in Westminster School, from which he proceeded to Trinity College, Cambridge, in 1714. On leaving Cambridge, where he was successful in obtaining a fellowship, he became a master in Westminster School, in which position he remained to the end of his life. The poet Cowper was one of his pupils, and turned some of his poems into English verse. The poems of Bourne consist of a considerable number of original Latin elegiacs, and of some translations of short English poems into Latin, which are as remarkable for their fidelity to the original as for the correctness and beauty of the Latin into which they are rendered. He is also the author of a few epitaphs in Latin and English. An edition of his works with the title 'Poemata' was published in 1734.

Bournemouth, bōrn'mūth, a famous watering-place in the south of England, 30 miles southwest of Southampton, on the English Channel, at the southwest corner of Hampshire, near the boundary of Dorsetshire. It is within the limits of the parliamentary borough of Christchurch, but forms a municipal borough by itself. It is situated on a semicircular bay at the mouth of a small stream, the Bourne, whence it derives its name. It is celebrated as a winter residence, and has of late become very popular as a seaside resort for consumptive and other delicate persons, owing to the mildness of its climate, while its many attractive features, including its fine sands, its interesting cliff and other scenery, and its pine-woods, bring to it numbers whose health is in no way defective. It is to a large extent laid out in villas and detached houses. The Westover Gardens in the centre of the town are a favorite resort; they include a winter garden, where orchestral concerts are regularly given. There are two piers, three arcades, assembly rooms, baths, etc. The buildings include hospitals, a sanatorium, home for consumptives, and some handsome churches, among the latter being the new Bennett Memorial church and St. Peter's church, both beautiful Gothic buildings. In the churchyard of the latter he buried William Godwin, Mary Wollstonecraft, and their daughter, the wife of Shelley. Pop (1901) 47,000.

Bour'nonite, boor'nōn-īt, a native sulphid of antimony, lead and copper, having the formula $3(\text{Pb}, \text{Cu}_2)\text{S} \cdot \text{Sb}_2\text{S}_3$. It has a metallic lustre, a black or steel-gray color, a hardness of from 2.5 to 3.0, and a specific gravity of about 5.8. It occurs massive, and also in orthorhombic crystals that are often twinned in a complicated manner, so as to resemble a wheel; from which circumstance the mineral is sometimes called "wheel-ore." It occurs chiefly in the Harz Mountains, in Cornwall (England), and in Mexico. In the United States it is found in Arizona, Arkansas, and Colorado. It also occurs in Ontario. Bournonite was named for Count de Bournon, a French mineralogist.

Bourrienne, Louis Antoine Fauvelet de, loo-e ān-twān fō-ve-lā də boo-ryēn, French historian and diplomatist; b. Sens, 9 July 1769; d. Caen, 7 Feb. 1834. He was educated with Bonaparte at the school of Brienne, where a close intimacy sprang up between them. On their separation in 1785, when Bonaparte set out to attend the École Militaire in Paris, they vowed an eternal friendship. At the age of 19 he proceeded to one of the German universities, with

the view of studying law and languages. He returned to Paris in 1792, and renewed his early friendship with Bonaparte, who employed him in drawing up, along with Gen. Clarke, the text of the Treaty of Campo Formio. From this period Bourrienne's diplomatic career commenced. He accompanied Bonaparte as his private secretary on his expedition to Egypt, and afterward continued in that capacity on his elevation to the consulate. In 1804 he was nominated by the emperor his minister-plenipotentiary at Hamburg. In the end of 1813 he returned to France, where he received the appointment of director of the posts, and in 1814 was made prefect of police. On the abdication of Napoleon he paid his court to Louis XVIII., who, on his restoration, nominated him a minister of state. The revolution of July, 1830, and the loss of his private fortune affected him so much that he lost his reason. He was removed to Normandy, and spent the last two years of his life in a lunatic asylum at Caen, where he died. His 'Mémoires sur Napoléon, le Directoire, le Consulat, l'Empire et la Restauration,' edited by Villemarest (1829-31), contain many interesting particulars of the youth of Napoleon, and also of the history of the directory and consulate, although they are blamed for want of accuracy in many points of detail.

Boursault, Edmé, ěd-mā boor-sō, French writer; b. 1638; d. Montluçon, 1701. Having gone to Paris and engaged in literature he both gained and lost the favor of royalty, and produced pieces for the stage with permanent success; among others, 'Ésope à la Ville,' and 'Ésope à la Cour,' which still continue on the stage. His two tragedies 'Marie Stuart' and 'Germanicus' are forgotten. Boursault had the misfortune to quarrel with Molière and Boileau. He wrote a severe criticism on the 'École des Femmes' under the title of 'Le Portrait du Peintre.' Molière chastised him in his 'Impromptu de Versailles.' To revenge himself on Boileau, who had ridiculed him in his satires, he wrote a comedy called 'Satyre des Satyres'; but Boileau prevented its performance. Boursault afterward took a noble revenge. He heard that Boileau was at the baths of Bourbonne entirely destitute; he hastened to him and compelled him to accept a loan of 200 louis d'or. Touched by this generous conduct, Boileau struck his name from his satires.

Bourse, boors, an exchange where merchants, bankers, etc., meet for the transaction of financial business. Used especially of the stock exchange of Paris. In the United States the exchange in Philadelphia is styled the Bourse.

Boussa, boos-sa. See BUSSANG.

Boussingault, Jean Baptiste Joseph Dieudonné, zhōn bāp-těst zhō-zéf dye-dōn-nā boo-sān-gō, French chemist; b. Paris, 2 Feb. 1802; d. there, 12 May 1887. He went to South America in the employment of a mining company, and made extensive travels and valuable scientific researches there. Returning to France he became professor of chemistry at Lyons in 1839, was made a member of the Institute, and then made Paris his chief residence. His works deal chiefly with agricultural chemistry, and include 'Economie Rurale' (translated into English and German); 'Mémoires de Chimie agricole et de Physiologie'; 'Agronomie, Chimie agricole, et Physiologie,' etc.

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Boussingaultite, boo-săn-gō'-tīt, a native hydrated sulphate of magnesium and ammonia, having the formula $(\text{NH}_4)_2\text{SO}_4 \cdot \text{MgSO}_4 + 6\text{H}_2\text{O}$, and crystallizing in prismatic forms belonging to the monoclinic system. It has a specific gravity of about 1.7. Boussingaultite occurs in the Tuscan lagoons in connection with boracic acid (q.v.), especially near Monte Cerboli. A closely similar mineral occurs in granular masses at Sonoma, Cal.

Boustroph'edon, a kind of writing found on Greek coins, and in inscriptions of the remotest antiquity. The lines do not run in a uniform direction from the left to the right, or from the right to the left; but the first begins at the left and terminates at the right; the second runs in an opposite direction, from the right to the left; the third, again, from the left; and so on alternately. It is called *boustrophedon* (that is, turning back like oxen) because the lines written in this way succeed each other like furrows in a ploughed field. The laws of Solon were cut in tables in this manner.

Boutelle, boo-těl', **Charles Addison**, American legislator: b. Damariscotta, Me., 9 Feb. 1839; d. 21 May 1901. He served in the navy during the Civil War, entering as an acting master, and being promoted to lieutenant for gallantry in action. In 1870 he became the editor of the *Bangor Whig and Courier*. He was elected to Congress in 1882, and held his seat till December, 1900, when he resigned, and was made a captain on the retired list of the navy. He was chairman of the House Committee on Naval Affairs in the 51st, 54th, and 55th congresses and was author of the bill (1890) authorizing the construction of the first modern battleships of the United States navy.

Bouterwek, Friedrich, frēd'rīh bow-tēr-vēk, German philosopher: b. 15 April, 1766, at Oker, a village not far from Goslar, in North Germany; d. Göttingen, 9 Aug. 1828. He was at first a follower of Kant, but finally attached himself to Jacobi. His 'Ideen zu einer allgemeinen Apodiktik' was the immediate fruit of his intimate acquaintance with the philosophical views of Fr. H. Jacobi. This work was published in two volumes, 1799. It was afterward completed by the 'Manual of Philosophical Knowledge' (1813), and by the 'Religion of Reason' (1824). In this work, as well as in his 'Aesthetik' (1806-1824), he had to contend with many powerful antagonists. Bouterwek has gained a permanent reputation by his 'Geschichte der neuern Poesie und Beredsamkeit' (History of Modern Poetry and Eloquence) (1801-19), a work which, though unequal in some respects, and in parts, especially in the first volume, partial and superficial, is an excellent collection of notices and original observations, and may be considered one of the best works of the kind in German literature. Among his minor productions, a selection of which he published in 1818, are many essays, which are superior to the best of his larger speculative works; for instance, the introduction to the History, in which he gives an account of his literary labors until that period, with great candor and with almost excessive severity against himself. His 'History of Spanish Literature' has been translated into Spanish, French, and English.

Bouto, boo-tō, or **Tucuxi**, Indian names for the dolphin (*Intia geoffrensis*) of the Amazon.

Bouton, John Bell, American author: b. Concord, N. H., 15 March 1830; d. Cambridge, Mass., 18 Nov. 1902. He edited the *Cleveland Plain Dealer* 1851-5, and was connected with the *New York Journal of Commerce* 1857-89. He contributed for ten years to Appleton's *Annual Cyclopaedia*, and published 'Loved and Lost' (1857); 'Round the Block' (1864); 'Treasury of Travel and Adventure'; 'Round about Moscow' (1887); 'Uncle Sam's Church' (1895); 'Memoirs of General Bell' (1902).

Bouts, Dirk, or **Dierick**, dērk or dē-rīk bows, Dutch painter: b. Haarlem, about 1410; d. 1475. He was a brilliant colorist and one of the most prominent members of the Flemish school. Among his works are the 'Martyrdom of St. Erasmus' in the Church of St. Peter, Louvain; and the 'Martyrdom of St. Hippolytus' in the cathedral of Bruges.

Bouts Rimés, boo-re-mā (French), words or syllables which rhyme, arranged in a particular order, and given to a poet with a subject, on which he must write verses ending in the same rhymes, disposed in the same order. Ménage gives the following account of the origin of this ridiculous conceit, which may be classed with the eggs and axes, the echoes, acrostics, and other equally ingenious devices of learned triflers. 'Dulot (a poet of the 17th century) was one day complaining, in a large company, that 300 sonnets had been stolen from him. One of the company expressing his astonishment at the number. 'Oh,' said he, 'they are blank sonnets, or rhymes (*bouts rimés*) of all the sonnets I may have occasion to write.' This ludicrous statement produced such an effect that it became a fashionable amusement to compose blank sonnets, and in 1648 a 4to volume of *bouts rimés* was published. Sarrazin's 'Dulot Vaincu, ou la Défaite des Bouts Rimés,' is an amusing performance.

Boutwell, bowt'well, **George Sewell**, American statesman: b. Brookline, Mass., 28 Jan. 1818. He was admitted to the bar in 1836; served in the State legislature in 1842-51; governor of Massachusetts in 1851-2; was an organizer of the Republican party in 1854, and appointed the first commissioner of the newly established Department of Internal Revenue in 1862. He was representative in Congress 1863-9; one of the managers of the impeachment trial of President Johnson; secretary of the treasury in 1869-73; and a United States senator in 1873-9. Besides numerous speeches he published 'Educational Topics and Institutions' (1859); several works concerning taxation; 'The Constitution of the United States at the End of the First Century' (1896); 'Reminiscences of Sixty Years in Public Affairs' (1902). Since 1898 he has been especially prominent as a leader of the Anti-Imperialists and vigorous opponent of the Philippine policy of the administration.

Bouvard, Joseph Antoine, zhō-zěf än-twän, French architect: b. Saint-Jean-de-Bournay, 19 Feb. 1840. He was a pupil of Constant Dufeux, whom he assisted in his work connected with the Panthéon, the Law School, and the Palace of the Luxembourg. He was appointed inspector of

public works in Paris, and, in 1879, was city architect, making himself famous by his work on the Théâtre Lyrique, the Church of St. Lawrence and the barracks of the Republican Guard. He transformed the old grain market into a Bourse; constructed the railway stations of Sainte Etienne and Marseilles; was architect of the Pavilion of the City of Paris at the exposition of 1878; and created the magnificent central dome of that of 1889. He had charge of the decoration of Paris at the time of the visit of the emperor of Russia, and won great popularity by the magnificence of the festivals which he arranged. In June 1897, he was appointed director of the newly created administrative direction of architecture and promenades. He was made an officer of the Legion of Honor in 1889. He took an important part in the preparation for the Universal Exposition of 1900, being director of architectural services and chief of the management of fetes, under M. Picard.

Bouvardia, boo-var'di-a, a genus of about 25 species of American shrubs or perennial herbs of the natural order *Rubiaceae*, natives mostly of tropical Mexico, some of Arizona and Texas. Several horticultural varieties are largely cultivated in greenhouses for their terminal cymes of long tubular white, red, or yellow, sometimes perfumed blossoms which are very useful as cut flowers during late fall and early winter. The type species are not cultivated commercially.

Bouvard, or **Bouvard**, boo-vär, Alexis, Swiss mathematician and astronomer: b. Haute Savoie, 27 June 1767; d. 7 June 1843. He went to Paris about 1785 to study mathematics and astronomy, and in 1793 obtained a position in the Paris Observatory. He is celebrated for his researches in the theory of planetary motions, especially those of Jupiter and Saturn. Later he took up the theory of Uranus, and was the first to suggest that the discrepancies between the old and new observations could only be reconciled by the hypothesis of another undiscovered disturbing planet, an opinion which he retained till his death, three years before the discovery of Neptune. He published 'Nouvelles tables de Jupiter et de Saturne' (1808); 'Mémoire sur les Observations Météorologiques, faites à l'Observatoire de Paris.'

Bouvé, Pauline Carrington, American novelist: b. Little Rock, Ark.; married Thomas Tracy Bouvé in 1898. Besides the historical novel 'Their Shadows Before' (1900) she has published 'La Toison d'Or' from the French of Amedée Achard (1900).

Bouvet, Joachim, French missionary: b. Mans, about 1662; d. Pekin, China, 28 June 1732. Sent by Louis XIV. to China to study the customs and institutions of that country, he was received with favor at the imperial court at Pekin, employed by the emperor in directing various constructions, and allowed to build a church even within the palace. He returned to France in 1697, with permission to take back with him to China as many missionaries as would undertake the voyage. He presented to Louis XIV. 49 works in the Chinese language, and in 1699 departed again for China with 10 associates, among whom was the learned Parenin. He labored for nearly 50 years with indefatigable ardor to promote the progress of the

sciences in that empire. He gave an account of the state of China in several treatises and letters, and made a dictionary of the language.

Bouvet, Marie Marguerite, American writer of books for young people: b. New Orleans, 14 Feb. 1865. She has published 'Sweet William' (1890); 'Little Marjorie's Love Story' (1891); 'Prince Tip-Tip' (1892); 'My Lady' (1894); 'A Child of Tuscany' (1895); 'Pierette' (1896); 'A Little House in Pimlico' (1898); 'Tales of an Old Château' (1900).

Bouvier, John, American jurist of French birth: b. Codognan, in the department of Gard, 1787; d. Philadelphia, 18 Nov. 1851. He was of a Quaker family, which emigrated to this country and settled in Philadelphia, when he was in his 15th year. He obtained employment for several years in a book store, became a citizen of the United States in 1812, published a newspaper for a short time at Brownsville, in the western part of Pennsylvania, studied law, and was admitted to the bar in 1818. During his studies he made a complete analysis of Blackstone's 'Commentaries.' In 1822 he began the practice of law in Philadelphia, in which city he resided till his death. He published, in 1839, a 'Law Dictionary, adapted to the Constitution and Laws of the United States of America, and of the several States of the American Union,' the fruit of 10 years' labor. In 1841 he published a new edition of Bacon's 'Abridgement of the Law.' His greatest work, published two months before his death, was the 'Institutes of American Law.' He was associate judge of the court of criminal sessions in Philadelphia from the year 1838, and was not only learned in the law, but in the literature of several languages.

Boves, José Tomas, military adventurer in Spanish America: d. 5 Dec. 1814. He was born in Castile, and of the lowest extraction. At the age of 30 he was employed as a naval officer to guard the American coasts, but betrayed his trust, and was condemned and imprisoned for bribery and prevarication. After his release, he was for a time a peddler, but found a vocation more agreeable to him when the war of independence broke out in 1810. He joined the royal forces, and became captain of a company in the army of Cagigal, but began to wage war on his own account after the defeat of Cagigal at Maturin. Boves established himself at Calabozo, Venezuela, and with 500 men, many of whom were slaves, defeated Mariño, the dictator of the eastern provinces. His little army was now increased by fugitives from justice, and all the white and colored vagabonds of the vicinity, at the head of whom he began a warfare which recalls the most desolating campaigns of the barbarous ages. He defeated the independents twice, slaughtered all his prisoners, and gained for his army the name of the Infernal Division. He was defeated by Rivas, and a part of his army, being taken captive, were put to death; but he quickly recovered his strength, resumed the offensive, and in 1814 defeated Bolívar and Mariño at La Puerta. The struggle was prolonged with alternate successes and reverses, and with incessant cruelties. Boves advanced toward Valencia, where the independents were strongly fortified, and after a blockade, forced the town to capitulate. To give a more solemn sanction to the terms of capitulation, a mass was celebrated between the two armies,

and at the moment of the elevation, the royalist general promised a strict and faithful observance of the treaty; but having entered the town, he ordered the republican officers and a large number of the soldiers to be shot. Boves was again victorious at Anguita, and obliged Bolivar to retreat to Carthagena. He now entered Caracas, and shortly after gained a new victory, and killed or wounded 1,500 of the independents. His last triumph was at Urica; he was struck by a lance, and died upon the field of battle. His funeral was celebrated amid bloody commotion, while his troops were putting to death the men, women, and children whom they had made prisoners.

Bovey, Henry Taylor, Canadian engineer: b. Devonshire, England. He was educated at Cambridge University and took up the profession of civil engineering. He was appointed professor of civil engineering and applied mechanics in McGill University in Montreal in 1887 and has since lived in Canada. He is a member of many professional societies both in England, Canada, and the United States, and is the author of 'Applied Mechanics' (1882); 'Theory of Structures and Strength of Materials' (1893); 'Hydraulics' (1895).

Bovidæ, one of the most extensive and important families of mammals, characterized pre-eminently by the possession of hollow persistent horns in both sexes, and the form of digestive apparatus which involves chewing the cud. The family consists of the large herbivorous animals with cloven hoofs, which are most prominent as game, and which have supplied nearly all our domestic animals, except horses and camels. This family includes all of the ruminants, except the deer, giraffes, and pronghorn, and embraces five sections or sub-families, namely: the antelopes (*Antilopinae*); the goats (*Caprinae*); the sheep (*Ovinae*); the musk-ox (*Ovibovinae*); and the oxen (*Bovinae*). Although in a general way the members of these sections are easily recognized, all are connected by intermediate examples whose position is assigned with difficulty, so that a general structural likeness covers even such different examples as the delicate antelopes and the heavy cattle. A conspicuous common character is found in the nature of the horns, which gave the name *Cavicornia* to the group in the early classifications. These horns are always in pairs, and consist of sheaths of horn growing from the skin and covering "cores," which are protuberances of bone from the frontal bones of the skull, varying in form in the different groups, and contain hollow spaces, which are extensions of the frontal sinuses. These horns begin to grow soon after the animal is born, and increase until they attain their full size with the maturity of the individual; with very few exceptions they are worn by both sexes, but those of the males, especially among sheep, are often considerably larger and more effective as weapons than those of the females. No animal outside of this family possesses hollow horns of this character, except the pronghorn, and in this case they are branched, and are annually shed, neither of which conditions ever occurs among the Bovidæ.

The Bovidæ are distributed throughout the whole world, except Australia and South America. They are in the main gregarious, and where

the nature of their habitat permits, as on the plains inhabited by most antelopes and certain bison, they gather into enormous herds. The sheep, goats, and some of the antelopes, are confined to mountain ranges; most of the oxen dwell in forests; and the musk-ox is restricted to Arctic lands. Most of these animals, however, show great adaptability to new climates and conditions, have a high degree of variability, and are susceptible of taming and domestication. In consequence they have furnished to mankind the most important of his aids to agriculture, as the cattle, sheep, and goats, which he has been able to take with him to every part of the world, to train to his service, or to develop by careful improvement into the great resources of food and clothing, which they have become. See DOMESTIC ANIMALS, and the names of the various groups and species composing the family.

Bovines, Flanders, a village within a short distance of Lille, celebrated for the memorable victory gained by Philip Augustus of France, over Otho IV. of Germany, and his allies, 27 July 1214. Philip of Valois defeated here, in 1340, 10,000 English troops; and, on 17 and 18 May 1794, the French here defeated the Austrians.

Bovino Italy (anciently *Bovinum*), a fortified town in the province of Foggia, 20 miles south southwest of Foggia, near the Cervaro; the seat of a bishopric, suffragan to Benevento. It has a cathedral, two parish churches, and several convents. The Spaniards were defeated here by the Imperialists in 1734. Pop. 7,613.

Bow, the earliest instrument known, and the most generally diffused, among all savage and barbarous people for the propulsion of missiles in the chase or in war. There are two forms of the bow, the long-bow and the cross-bow, the former of which is the earlier, the more general, and by far the more celebrated, as being the weapon of the famous English archers of the Middle Ages, who were popularly said to carry at their belts the lives of four-and-twenty Scots, that being the number of clothyard arrows in their quivers. The long-bow passed out of use as a military weapon with the improvement of firearms; but there were men yet alive in the beginning of this century who remembered that the Highlanders, in the Jacobite rising of 1715, carried bows and arrows; and at the capture of Paris, in 1814, Bashkirs and Circassians, in the service of Russia, were seen in the streets of that city, armed in chain-mail, with bow-cases and quivers. Some of the North American Indians, especially the Comanches and the Apaches were very expert with the bow. Whatever the substance of which the bow is made, whether of wood, horn or steel, its figure is nearly the same in all countries, having generally two inflexions, between which, in the place where the arrow is fixed, is a right line. The Grecian bow was somewhat in the form of the letter Z: in drawing it, the hand was brought back to the right breast, and not to the ear. The Scythian bow was distinguished for its remarkable curvature, which was nearly semi-circular; that of the modern Tartars is similar to it. The materials of bows have been different in different countries. The Persians and Indians made them of reeds. The Lycian bows were made of

BOVIDAE



1. Celebes Wild Ox or Anoa.
2. North American Bison or Buffalo.
3. Indian Domestic Buffalo.

BOW BELLS—BOWDICH

the cornel-tree; those of the Ethiopians of the palm-tree. That of Pandarus was made from the horn of a mountain goat, 16 palms in length: the string was an oxhide thong. The horn of the antelope is still used for the same purpose in the East. The long-bow was the favorite national weapon in England. The battles of Crecy (1346), Poitiers (1356), and Agincourt (1415) were won by this weapon. It was made of yew, ash, etc., of the height of the archer. The arrow being usually half the length of the bow, the cloth-yard was only employed by a man six feet high. The arbalest, or cross-bow, was a popular weapon with the Italians, and was introduced into England in the 13th century. The arrows shot from it were called quarrels.

Of the power of the bow, and the distance to which it will carry, some remarkable anecdotes are related. Xenophon mentions an Arcadian whose head was shot through by a Carduchian archer. Stuart mentions a random shot of a Turk, which he found to be 584 yards; and Mr. Strutt saw the Turkish ambassador shoot 480 yards in the archery ground near Bedford Square. Lord Bacon speaks of a Turkish bow which has been known to pierce a steel target or a piece of brass two inches thick. In the journal of King Edward VI it is mentioned that 100 archers of the king's guard shot at a one inch board, and that some of the arrows passed through this and into another board behind it, although the wood was extremely solid and firm. It has been the custom of many savage nations to poison their arrows. This practice is mentioned by Homer and the ancient historians; and we have many similar accounts of modern travelers and navigators from almost every part of the world. Some of these stories are of doubtful authority, but others are well authenticated. Some poison obtained by Condamine from South American savages produced instantaneous death in animals inoculated with it. The poisoned arrows used in Guiana are not shot from a bow, but blown through a tube. See AIR-GUN; also ARCHERY.

In music it is the well-known implement by the means of which the tone is produced from viols, violins, and other instruments of that kind. It is made of a thin staff of elastic wood, tapering slightly till it reaches the lower end, to which the hairs (about 80 or 100 horse-hairs) are fastened, and with which the bow is strung. At the upper end is an ornamented piece of wood or ivory called the nut, and fastened with a screw, which serves to regulate the tension of the hairs. It is evident that the size and construction of the bow must correspond with the size of the species of viol-instruments from which the tone is to be produced.

Bow Bells, the peal of bells belonging to the Church of St. Mary-le-Bow, Cheapside, London, and celebrated for centuries. One who is born within the sound of Bow Bells is considered a genuine cockney.

Bow Island, an island in the South Pacific Ocean, near the eastern extremity of the Society Isles, in lat. 18° 6' S. and lon. 140° 51' W. It is a low island, of coral formation, about 30 miles in length and 5 miles in breadth. It derives its name from its shape, which is bow-like, the outer edge only being of land, and encircling a great central lagoon. It was discovered by Bougainville in 1768.

Bow Legs, a deformity of the legs in which the knees are far apart and the leg is bowed outward. It is technically known as *genu varum* and is the opposite of knock-knees, or *genu valgum*. Two forms are common, in one the bow is a gradual one, practically the entire leg being bent, in the other the bend takes place quite suddenly just above the ankle. Sometimes the bow is front and back instead of sideways. Bow leg is the commonest of the deformities, making fully 10 per cent of all orthopedic cases. It may be congenital, it is usually due to rickets (q.v.) and perhaps may occur in strong and heavy children who stand too much while very young. In the majority of cases it is outgrown, but in pronounced instances it can be cured only by prolonged correction by means of appropriate braces.

Bow-window, in architecture, properly a window forming a recess or bay in a room, projecting outward, and having for the outline of the plan a segment of a circle. This term is, however, often confounded with bay-window and oriel, which properly designate, the first a similar window with a straight-sided plan, and the second a projecting window not on the ground-floor, and supported on a corbel or other molded base.

Bow-wood. See OSAGE ORANGE.

Bowdich, Thomas Edward, African traveler, one of the victims of the attempts to explore the interior of the Dark Continent: b. Bristol, June 1790; d. 10 Jan. 1824. He was sent to Oxford, but was never regularly matriculated. At an early age he married, and engaged in trade at Bristol. Finding the details of business irksome, he obtained the appointment of writer in the service of the African Company, and set sail for Africa in 1814. In 1816, it being thought desirable to send an embassy to the negro king of Ashantee, Bowdich was chosen to conduct it; and he executed with success the duties of his situation. After remaining some time in Africa he returned home, and soon after published his 'Mission to Ashantee, with a Statistical Account of that Kingdom, and Geographical Notices of other Parts of the Interior of Africa.' Having offended the company in whose service he had been engaged, and having, therefore, no prospect of farther employment, yet wishing ardently to return to Africa for the purpose of visiting its hitherto unexplored regions, Bowdich resolved to make the attempt with such assistance as he could obtain from private individuals. He, however, previously went to Paris to improve his acquaintance with physical and mathematical science. His reception from the French literati was extremely flattering. A public eulogium was pronounced on him at a meeting of the Institute, and an advantageous appointment was offered him by the French government. To obtain funds for the prosecution of his favorite project, Bowdich also published a translation of 'Mollien's Travels to the Sources of the Senegal and Gambia,' and other works; by the sale of which he was enabled, with a little assistance from other persons, to make preparations for his second African expedition. He sailed from Havre in August 1822 and arrived in safety in the river Gambia. A disease, occasioned by fatigue and anxiety of mind, here put an end to his life.

BOWDITCH — BOWDOIN

Bowditch, Henry Ingersoll, American physician: b. Salem, Mass., 9 Aug. 1808; d. 14 Jan. 1892. He received his degree at Harvard in 1832; was professor of clinical medicine at Harvard in 1859-67; chairman of the State Board of Health in 1869-79; and president of the American Medical Association in 1877. He announced the law of soil moisture as a cause of consumption in New England; introduced several new features in surgical treatment, and was author of many general and special works in medical science. He was the first to practise chest-puncture in cases of pleurisy.

Bowditch, Henry Pickering, American educator: b. Boston, Mass., 4 April 1840. He was graduated at Harvard in 1861, and subsequently studied chemistry and medicine, and, after the Civil War, in which he reached the rank of major in the Union service, he took a special course in physiology in France and Germany. In 1871-6 he was assistant professor of physiology in the Harvard Medical School, and in 1876 was elected to the full chair. He is a member of the American Academy of Arts and Sciences, as well as of numerous medical societies, and has published many papers on physiological subjects.

Bowditch, bow'dīch, Nathaniel, American mathematician: b. Salem, Mass., 26 March 1773; d. Boston, 16 March 1838. The son of a cooper he went to school till 10 years of age, when he entered his father's shop. Later he was apprenticed to the ship chandlery business, which he followed till he went to sea. He studied incessantly, during intervals of business and in morning and night hours. Mathematics was the science in which he was most interested, and he mastered algebra and Latin unaided. He had a teacher for French, and in later life he took up Spanish, Italian, and German. He learned navigation and was an omnivorous reader. In 1795 he made his first voyage as clerk, later as supercargo, and in the course of five long voyages rose to be master. Harvard College gave him the degree of M.A. and offered him the professorship of mathematics, which he declined, as he also did a similar offer from the University of Virginia, and the United States Military Academy. Between 1814 and 1817 he translated Laplace's '*Mécanique Céleste*,' and appended to it an elaborate commentary. He contributed largely to scientific periodicals, his articles being principally on mathematics and astronomy. He was admitted as a Fellow to the Royal Society of London.

Bowditch's Practical Navigator, a work on navigation of the highest value and utility to seamen, written by Nathaniel Bowditch (q.v.) and published in 1802.

Bowdler, bō'dler, Thomas, English expurgator: b. near Bath, 11 July 1754; d. Rhyddings, South Wales, 24 Feb. 1825. At the age of 16 he went to St. Andrews to study medicine, but graduated M.D. at Edinburgh in 1776, and, after some years of travel, settled in London, devoting himself mainly to charitable work. He lived for 10 years at St. Boniface, Isle of Wight, and for the last 15 years of his life at Rhyddings, near Swansea. In 1818 he published '*The Family Shakespeare*,' in 10 volumes; in which nothing is added to the original text; but those words and expressions are

omitted which cannot with propriety be read aloud in a family. The work had a large sale, and was long popular, despite the ridicule it brought down upon the head of its over-prudish editor, who had the happiness or unhappiness to add permanently to the English tongue the word "bowdlerism" as a synonym for senseless expurgation. The last years of Bowdler's life were given to the task of preparing a purified edition of Gibbon's '*History*.'

Bowdlerism. See BOWDLER, THOMAS.

Bowdoin, bō'dōn, James, American statesman: b. Boston, 8 Aug. 1727; d. there, 6 Nov. 1790. Graduating from Harvard in 1745, he inherited in 1747 a large fortune from his father, a wealthy merchant, and was thus provided with means to gratify his taste for scientific investigation. In 1751 he visited Franklin, who explained to him the results of his electrical researches. A correspondence ensued that lasted many years, and Franklin read Bowdoin's letters before the Royal Society of London. He was a prominent figure in the politics of his State, being elected a member of the General Court 1753-6, and of the Council 1756-69. He presided over the Constitutional Convention in 1779, and to him was due the form of some of the most admired sections of the constitution it drew up. As governor, 1785-6, he quelled Shay's Rebellion. In 1788 he was a delegate to the Federal Constitutional Convention. He was a Fellow of Harvard College from 1779 to 1785 and to it he left a legacy of £400. A founder and first president of the American Academy of Arts and Sciences, he bequeathed it his very valuable library. The degree of Doctor of Laws was conferred upon him by the universities of Yale and Edinburgh. Bowdoin College in Brunswick, Me., was named in his honor. He wrote a poetical paraphrase of Dodsley's '*Economy of Human Life*' (1759), and several papers which may be found in the first volume of the American Academy's '*Memoirs*.' To the '*Pietas et Gratulatio*,' a volume of poems published by Harvard on the accession of George III., he contributed an English poem and two Latin epigrams.

Bowdoin, James, American statesman (son of the preceding): b. Boston, 22 Sept. 1752; d. Naushon Island, Buzzard's Bay, 11 Oct. 1811. He was graduated from Harvard in 1771, studied at the University of Oxford, and traveled in Europe. At the outbreak of the Revolution he returned home and became successively a member of the Assembly, the State Senate, and a delegate to the State Constitutional Convention, 1779. In Jefferson's administration he was appointed minister plenipotentiary at the court of Spain, and associate minister to France. During his residence abroad he accumulated a valuable library, a collection of paintings and drawings by old and modern masters, a cabinet of minerals and fossils, together with models of crystallography, all of which he bequeathed to Bowdoin College, of which he was the earliest patron. During his lifetime he gave it 6,000 acres of land and £1,100, and at his death it became, by will, his residuary legatee. He translated Daubenton's '*Advice to Shepherds*,' and was the anonymous author of '*Opinions respecting the Commercial Intercourse Between the United States and Great Britain*.'

BOWDOIN COLLEGE — BOWER

Bowdoin College, the oldest college in Maine, is in Brunswick; organized in 1794 under the auspices of the Congregational Church. It was opened in 1802 with eight students. Among its celebrated students were Hawthorne, Longfellow, J. S. C. Abbott, Franklin Pierce, S. S. Prentiss, and Calvin E. Stowe. Longfellow was professor of modern languages at the college from 1829-35. At the end of 1899 the college reported: Professors and instructors, 132; students, 360; scholarships, 91; volumes in the library, 64,000; grounds and buildings valued at \$500,000; productive funds, \$629,000; income \$63,000; number of graduates, 4,676; president, William De Witt Hyde, D.D.

Bow'ell, Sir Mackenzie, Canadian statesman: b. Rickingham, Suffolk, England, 27 Dec. 1823. He went to Canada when 10 years old and learned the printing trade, becoming editor of the *Belleville Intelligencer*. He served in the Canadian militia. After the Confederation he served in the Dominion House of Commons for 25 years. In 1878 he entered the MacDonald Cabinet, and in 1894 formed an administration of his own. He relinquished Cabinet office in 1896, and in 1897 he declared his independence of all party affiliation.

Bowen, bō-en, Francis, American educator and author: b. Charlestown, Mass., 8 Sept. 1811; d. Cambridge, Mass., 21 Jan. 1890. He was graduated from Harvard in 1833, and for a time taught mathematics in Phillips-Exeter Academy. He became instructor in natural philosophy and political economy at Harvard, 1835; studied in Europe, 1839-41, meeting Simondi and De Gerando. Returning to Cambridge in 1843 he took charge of the 'North American Review,' as editor and proprietor, and conducted it with great ability for nearly 11 years. On account of his having taken the unpopular side in the 'Review' on the Hungarian question, the overseers of Harvard refused to concur with the corporation in appointing him professor of history in 1850. When Dr. Walker became president of Harvard in 1853, Prof. Bowen was elected Alford professor of natural religion, moral philosophy, and civil polity, and held that chair until 1888, when he became professor emeritus. He opposed the doctrines of Darwin and accepted those of Sir William Hamilton. He was a clear, forceful, independent thinker, and possessed a style notable for its energy and precision. As a writer he was most industrious, treating with success widely varying topics. The following is a selected list of his publications: 'Documents of the Constitutions of England and America, from Magna Charta to the Federal Constitution of 1789' (1854); 'The Principles of Metaphysical and Ethical Science applied to the Evidences of Religion' (1855); 'Dugald Stewart's Philosophy of the Human Mind, with Critical Notes' (1854); 'Principles of Political Economy' (1856); 'The Metaphysics of Sir William Hamilton' (1862); 'De Tocqueville's Democracy in America, edited with notes' (1862); 'Logic, or the Laws of Pure Thought' (1864); 'American Political Economy' (1870); 'Modern Philosophy from Descartes to Schopenhauer and Hartmann' (1877); 'Gleanings from a Literary Life' (1880); 'A Layman's Study of the English Bible' (1886).

Bowen, Henry Chandler, American editor and publisher: b. Woodstock, Conn., 11 Sept. 1813; d. 24 Feb. 1896. He received a common school education and entered business. In 1848 he helped to found the 'Independent,' in New York, becoming, in 1861, its editor and proprietor, and making the paper famous for its advanced views on public topics.

Bowen, Herbert Wolcott, American diplomatist (son of the preceding): b. Brooklyn, N. Y., 29 Feb. 1856. He was educated at Yale College and at the Columbia Law School. He was appointed United States consul at Barcelona in 1890 by President Harrison, and in 1894 President Cleveland made him consul-general of the same port. At the opening of the Spanish-American war he remained at his post as long as was practicable, and at the conclusion of the war was appointed by President McKinley consul-general at Teheran, and in May 1901 minister plenipotentiary to Persia. He was subsequently appointed minister to Venezuela, and during the hostilities between that country and England and Germany in the opening months of 1903 won general commendation for his skillful diplomacy. He has published 'Verses'; 'Losing Ground'; 'In Divers Tones'; 'De Genere Humano'; 'International Law.'

Bowen, John Wesley Edward, American theologian: b. New Orleans, 3 Dec. 1855. He graduated at Boston University in 1878, and in 1885 received the degree of Ph.D., from the University of New Orleans. He held pastorates in Newark, N. J., Boston, Baltimore, and Washington, 1882-92. Since 1888 he has been professor of the history of theology in Gammon Theological Seminary, Atlanta, Ga. He is a recognized leader in all educational and social movements for the betterment of the colored race, and an example of its possibilities in scholarly attainment. Publications: 'Sermons'; 'Africa and the American Negro'; 'Discussions in Philosophy and Theology'; 'Struggle for Supremacy between the Church and State during the Middle Ages'; 'The Catholic Spirit of Methodism'; 'The Theology and Psychology of the Negro Plantation Melodies'; 'The Psychological Process in the Revelation of Doctrine.'

Bow'enite, a massive form of serpentine, light green in color, and characterized by a fine grained structure, and a hardness of from 5.5 to 6 (which is materially higher than the hardness of ordinary serpentine). Its specific gravity is from 2.6 to 2.8. The typical locality for the mineral is Smithfield, R. I.; but closely similar varieties are found in New Zealand, in the Punjab, and in Afghanistan. Bowenite resembles jade, and is sometimes used in the manufacture of ornamental articles. It was named for George T. Bowen, who first described it, in 1822.

Bow'er, Archibald, Scottish writer: b. near Dundee, 17 Jan. 1686; d. London, 3 Sept. 1766. He entered the order of Jesuits in 1706. At Macerata, in Italy, according to his own account, he was counselor or judge of the Inquisition. In 1726 he quitted the order of Jesuits and went to Perugia, whence he fled secretly to England and professed himself a convert to the Protestant faith. He obtained respectable patronage, was engaged as a tutor in a nobleman's family, and employed by the

BOWER-BIRDS — BOWERS

booksellers in conducting the 'Historia Literaria,' a monthly review of books, and in writing a part of the 'Universal History,' in 60 vols. 8vo. The money which he gained by these occupations he is believed to have given or lent to the society of the Jesuits, and thus to have purchased his re-admission among them about the year 1744. Subsequently repenting of the engagement he had made with his old associates, he claimed and recovered the property he had advanced. In 1748 he published the first volume of a 'History of the Popes,' which was continued to seven volumes and characterized by the utmost zeal against Roman Catholicism. His money transactions with the Jesuits being at last brought to light, he was generally believed to be a man destitute of moral or religious principle; so that toward the end of his life he had hardly a friend or patron left except Lord Lyttelton. He is said to have died a Protestant.

Bower-birds, a group of birds of the bird-of-paradise family, dwelling in Australia and the neighboring islands, remarkable for the construction of bowers or "play-houses" in addition to their ordinary breeding-nests. All are of moderate size, of dark and plain plumage, having few ornaments of color and none of feather characteristic of other birds-of-paradise, although, like them, they are of aboreal habits, feed mainly upon fruits, and construct rather rude nests for their eggs in branches of trees. In addition to the nest proper, the males of all the bower-birds build upon the ground bowers or shelters of various forms, which serve as places for assembling and holding the series of antics or dances, in rivalry with each other, and as a display of their respective attractions to the females, in which these birds indulge during the season of courtship. These buildings always occupy a little space in the forest which is first carefully cleared of every obstruction, so that they look like small cultivated lawns. A few species are content with such a lawn, but most erect buildings which vary in form according to the species. The satin-bird (*Ptilorynchus violaceus*) of southern Australia forms of twigs, a few inches in length, an oblong, dome-shaped hut, open at each end and floored with twigs. The sides of this hut are formed of slender twigs, planted upright, and leaning inward to form a roof. Its floor, and the ground all about it, are strewn with highly colored feathers and bright objects of all sorts, which the bird brings, day by day, sometimes from a great distance, to add to his store, replacing dull or faded pieces with something better as he finds them. The people of the region are accustomed to search these collections for such lost articles as bits of bright jewelry, which the birds frequently seize and take there. The spotted bower-birds, of the genus *Chlamydera*, form "runs" or avenues about three feet long, formed of a dense platform of sticks fenced in on each side by a hedge of upright twigs, and place near it hundreds of white pebbles, pieces of bleached bone, shells, and bright objects, which they rearrange with incessant activity. One species gathers snail-shells exclusively. Another species make several little huts—a miniature of a village of the black fellows. The most remarkable of these structures, however, is that of a New Guinea species (*Amblyornis inornatus*) which is called "gardener-bird" in the

books. This bird clears a space around the base of a small tree, and then piles up around its base a cone of moss, about 18 inches in height. Outside of this, and at a distance of four or five inches, it plants a circle of twigs, some of which are two feet in length, so that they form a conical hut, covering and enclosing the inner cone. Two doors are left in this outer hut at opposite sides. The twigs of which this "wigwam" is composed are always the thin stems of an epiphytall orchid, which retain their leaves and remain alive and blooming for a long time; and it is believed by Dr. Beccari, who first described this bird, that the orchids are chosen because they will remain alive. He says, however, that this apparent attempt to provide flowers is not restricted to the cabin. Directly in front of the entrance is made a miniature meadow of soft moss, which is kept smooth and clean, and upon which are scattered flowers and fruit of different colors, bright fungi, and brilliantly colored insects, so that the place reminds one of an elegant little garden. Moreover, when these objects have been exposed so long so as to become wilted they are taken away and replaced by others, so that it seems impossible to believe that the birds do not take a real delight in the freshness of their flowers, and the brightness and color of their ornaments. The activity and curiosity of all these bower-birds are strong characteristics, and they seem to derive great amusement, not only from their architectural arrangements, but in gathering, placing, and rearranging their treasures, and in keeping the premises in the neatest and prettiest condition possible. It is difficult to understand how any other purpose is served by these structures than simply that of providing a convenient place for the lively movements by which they display themselves to the females, as has been alluded to above, and for the duels which frequently take place between rival males, sometimes with fatal results; but to this must be added the gratification of an inherited instinct of acquisitiveness, and a real delight in beautiful things. The species of another genus (*Prionadura*) make similar "bowers" four to six feet high.

Detailed descriptions of these and several other similar birds and their works will be found in the books relating to the ornithology of Australia and New Guinea, and especially in the writings of the Italian naturalists, Beccari and Salvadori. An excellent *résumé* may be read in Lydekker's 'Royal Natural History,' Vol. III. (Lond. 1885). Several species have been brought alive to Europe and may usually be seen, with their curious bowers, in the zoological gardens of London, Paris, and elsewhere; while the museums in New York and Washington contain models of some of their ornamental structures.

Bowers, Elizabeth Crocker, American actress: b. Ridgefield, Conn., 12 March 1830; d. Washington, D. C., 6 Nov. 1895. She made her first appearance on the stage at the Park Theatre, New York, in 1846, and in 1847 married David P. Bowers and appeared in Philadelphia as Donna Victoria in 'A Bold Stroke for a Husband.' She was a stock member of the Arch Street company in Philadelphia until her husband's death in 1857. She remarried in 1860, and in the next year made a professional trip to England with great success. She

BOWERS—BOWLING GREEN

returned to New York in 1863, and, after fulfilling several engagements, retired from the stage. In 1884 she returned to the stage in 'La Charbonniere,' and in 1886 began a series of performances with her own company at the 14th Street Theatre in New York. She played with Rose Coghlan in 'A Woman of No Importance,' in 1893, and supported Olga Nethersole in her first appearance in the United States in 1894. Her last impersonation was that of Lady Margrave in 'The New Woman' in the early part of 1895.

Bowers, Theodore S., American soldier: b. Pennsylvania, 10 Oct. 1832; d. Garrison's Station, N. Y., 6 March 1866. At the outbreak of the Civil War he was editor of a Democratic paper in Mount Carmel, Ill. After the battle of Bull Run he raised a company for the 48th Illinois Infantry, but declined its captaincy on account of the taunts of former political associates, and went to the front as a private. On 25 Jan. 1862 he was detailed as a clerical assistant at Gen. Grant's headquarters. That officer found him invaluable and kept him near him until the close of the war. He went through the campaigns of Forts Henry and Donelson, and while the army was absent on the Talla-hatchie expedition Bowers was left in charge of the department headquarters, having received a regular staff appointment as captain and aide-de-camp. When Van Dorn seized the headquarters at Holly Springs 20 Dec. 1862, Bowers destroyed all the departmental records that would have been of value to the Confederates, refused to give his parole, and made his escape during the night. He was twice brevetted for gallant and meritorious services, and after the war Gen. Grant retained him on his personal staff, having procured his appointment as assistant adjutant-general with rank of major in the United States army, 6 Jan. 1865. He was killed while boarding a moving train.

Bowery, The, a street in New York. It begins at Chatham Square and terminates at Cooper Union. It was long notorious for the resorts located along its length, but its character has undergone improvement.

Bowfin, a fish (*Amia calva*) of the Mississippi Valley. See MUDFISH.

Bowhead, the Greenland or right whale, taking its name from the arched outline of its head. See GREENLAND WHALE.

Bowie, bō'e, James, American frontiersman: b. Burke County, Ga., about 1790; d. 6 March 1836. He took part in the revolt of Texas against Mexico, and fell in the Alamo massacre. He gave his name to the bowie-knife (q.v.).

Bowie-knife, a long knife shaped like a dagger, but with only one edge, named after Col. James Bowie (q.v.). Its use as a weapon was originally confined to Texas, but is now used in almost all the States of the Union. Col. Bowie is said to have had his sword broken down to within about 20 inches of the hilt in a fight with some Mexicans, but he found that he did such good execution with his broken blade that he equipped all his followers with a similar weapon.

Bowker, Richard Roger, American author: b. Salem, Mass., 1848. He has been prominent in politics as an independent and was the ori-

ginator of the independent Republican movement of 1879. He has edited the 'Publisher's Weekly,' the 'Library Journal,' and the 'American Catalogue,' and has published 'Work and Wealth'; 'Economics for the People'; 'Copyright: Its Law and Its Literature'; 'Primer for Political Education'; 'Electoral Reform'; 'The Arts of Life'; 'Civil Service Examination.'

Bowles, Francis Tiffany, American naval constructor: b. Springfield, Mass., 7 Oct. 1858. He was graduated at the United States Naval Academy in 1879, and has ever since been prominent in the work of naval construction, with special reference to the rehabilitated United States navy. He has been in charge of construction at the navy yards in Norfolk and Brooklyn, and was made chief constructor of the navy with the rank of rear admiral in 1901.

Bowles, Samuel, American journalist: b. Springfield, Mass., 9 Feb. 1826; d. 16 Jan. 1878. He was editor and proprietor of the Springfield *Republican* and a prominent factor in public affairs. He wrote 'Across the Continent' and 'The Switzerland of America.'

Bowles, William A., Indian agent and chief: b. Frederick County, Md.; d. 23 Dec. 1805. When 13 years of age he ran away from home and joined the British army at Philadelphia. He afterward went among the Creek Indians, married an Indian woman, and was one of the English emissaries to excite them against the Americans. After the war he went to England, and on his return his influence among the Indians was so hostile to the Spaniards that they offered a price of \$6,000 for his capture. He was taken in July 1792, sent to Madrid, and afterward to Manila. Having obtained leave to visit Europe, he returned among the Creeks and instigated them to renewed hostilities. He was betrayed again into the hands of the Spaniards in 1804, and died in Morro Castle, Havana. His biography was published in London in 1791.

Bowles, William Lisle, English poet: b. King's Sutton, Northamptonshire, where his father was vicar, 1762; d. Salisbury, 7 April 1850. He was educated at Winchester and Oxford, where he gained high honors. In 1789 he composed a series of sonnets by which the young minds of Coleridge and Wordsworth, then seeking for new and more natural chords of poetry, were powerfully affected to such an extent that Bowles is considered to have created, by his influence, the Lake School of Poetry. In 1806 he issued a critical edition of Pope, which led to a memorable controversy (1809-25), in which Byron and Campbell were his opponents. His other works include: 'The Grave of Howard' (1790); 'Coombe Ellen' (1798); 'The Battle of the Nile' (1799); 'The Spirit of Discovery' (1804), his longest poem; and 'St. John in Patmos' (1832).

Bowling (bō'ling) Green, Ky., a city and county-seat of Warren County, 114 miles southwest of Louisville, of prominence as an educational centre. Here are situated Ogden College, founded in 1877; Potter College for women, opened in 1880; the Southern Normal School; Saint Columbia's Academy; and a business college. The city is surrounded by a fertile agricultural region, has an important trade in hogs and mules, and one of the largest horse markets

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in the State. It contains two parks, one of 42 acres, and owns and operates its waterworks and electric-lighting establishment. It was incorporated in 1812 and is governed by a mayor elected every four years, and a city council. At the time of the Civil War Bowling Green was of much strategic importance to the Confederate army. Pop. (1900) 8,226.

Bowling Green, Mo., a city and county-seat of Pike County, 90 miles northwest of St. Louis; situated on the Chicago & A. and St. Louis & H. R.R.'s. It was settled in 1820, and incorporated in 1838. Pike College is here located and among the industries of the place are flour and pipe manufacturing. Pop. (1900) 1,902.

Bowling Green, New York City Park, a small open space at the foot of Broadway, originally a village green and an aristocratic centre of the city. Fort Amsterdam, which had formerly stood at the south of the green, was removed in 1787 and the governor's residence took its place. The present Green is a very small enclosed park.

Bowling Green, Ohio, a city and county-seat of Wood County; situated on the Cincinnati, H. & D., and the Toledo & O. C. R.R.'s, 22 miles south of Toledo. It carries on a trade in farm produce and is the centre of a region producing oil and natural gas. Among the other industries are iron smelting, canning and glass-cutting. Private companies operate waterworks, gas works, an electric-lighting system, and a hot water heating plant. The city was settled in 1832 and incorporated in 1854. It is governed by a mayor biennially elected and a municipal council of six members. Pop. (1900) 5,067.

Bowls, Bowling, an American indoor game; also much played in Great Britain, and probably a modification of the English game of skittles (q.v.). It is played in a covered alley of carpenter's work from 65 to 70 feet in length and about 3 feet 6 inches wide. The alley has a gutter on each side, and is slightly convex in the centre, and regularly beveled toward the gutters. At the farther extremity ten pins, generally of ashwood, about 12 inches high, and shaped somewhat like a champagne bottle with a slightly tapering base, are set up in the form of a triangle having its apex toward the bowler; that is, with four pins on the rear or fourth line, three on the third, two on the second, and one on the first line, all being 12 inches apart. The pins are uniform in weight. The balls may never exceed 27 inches in circumference; but smaller sizes are optional. The bowler is entitled to two (formerly three) balls, which he rolls at the pins, the object being to knock down as many pins as possible, the number displaced being registered to the bowler's credit. The first record of a match seems to have been made on 1 Jan. 1840, at the Knickerbocker Alleys, New York; but it was not until 1875 that the bowlers of the principal cities held a convention for the purpose of framing rules for the game, and it was 20 years later when the American Bowling Congress brought the sport into anything like systematic order. The rules of the game in all its varieties are published by the Congress.

Another form of bowls, an ancient English game, is still extremely popular in its own coun-

try. It is played on a smooth, level piece of green sward, generally about 40 yards long, and surrounded by a trench or ditch about 6 inches in depth. A small white ball, usually of earthenware, called the jack, is placed at one end of the green, and the object of the players, who range themselves in sides at the other, is so to roll their bowls that they may lie as near as possible to the jack. Each bowl is much larger than the jack, is made of lignum-vitæ or similar wood, and is biased by being made slightly conical, so as to take a curvilinear course; and in making the proper allowance for this bias, and so regulating the cast of the ball, consist the skill and attraction of the game. The side which owns the greatest number of bowls next the jack — each bowl so placed constituting a point — carries off the victory. The game played in Scotland differs in several respects from that of England; and the latter country, unlike the former, has as yet no national bowling association.

Bowman, bö'män, Alexander Hamilton, American soldier: b. Wilkes-barre, Pa., 15 May 1803; d. there, 11 Nov. 1805. He graduated from the United States Military Academy 1825, and entered the engineer corps. For a time he was assistant professor of geography, history, and ethics at the academy. He acted as assistant engineer in the construction of the defenses, and of the improvement of harbors and rivers on the Gulf of Mexico, 1826-34, and was superintending engineer of the construction of Fort Sumter, 1838-51. Later he was chief engineer of the construction bureau of the United States treasury, and employed in building custom-houses, post-offices, marine hospitals, etc. During the Civil War he was superintendent of the United States Military Academy, and from 20 June 1865 till his death a member of the board of engineers to carry out in detail the modifications of the defenses in the vicinity of Boston, Mass. He attained his lieutenant-colonelcy in the engineer corps, 3 March 1863.

Bowman, Edward Morris, American organist: b. Barnard, Vt., 1848. His musical education was thorough and varied. He studied in New York under Dr. William Mason, in London under Dr. Bridge, in Berlin under Weitzmann and Bendel, and in Paris under Guilmant. He has been conspicuously successful as an organist, choral conductor, and teacher. In 1895 he took charge of the Temple Choir in connection with the Baptist Temple, Brooklyn, N. Y., and succeeded in making popular a high standard of music, both ecclesiastical and secular. In 1891 he succeeded Dr. F. Ritter as professor of music at Vassar College. He was a founder and for eight terms president of the American College of Musicians. His compositions comprise songs, part songs, anthems, and orchestral numbers, and he has published: 'Bowman-Weitzmann Manual of Musical Theory' (1877); 'Harmony: Historic Points and Modern Methods'; 'Formation of Piano Touch'; 'Relation of Musicians to the Public.'

Bowman, Thomas, American Methodist bishop: b. Berwick, Pa., 15 July 1817. He graduated at Dickinson College 1837, and entered the ministry in the Baltimore conference of the Methodist Episcopal Church. In 1848 he organized the Dickinson Seminary at Williams-

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port, Pa., and was its president for 10 years. In 1858 he was elected president of Indiana Asbury University (now DePauw University), remaining there until May 1872, when he became a bishop. He has visited all the conferences in the United States, Europe, India, China, Japan, and Mexico, and is distinguished for his fine pulpit eloquence.

Bowman, Sir William, English anatomist and surgeon: b. Nantwich, 20 July 1816; d. London, 29 March 1892. He was for some time surgeon to King's College Hospital, London, and professor of physiology and anatomy in King's College, and was especially distinguished as an ophthalmic surgeon. He gained the Royal Society's royal medal for physiology in 1842. In 1880 Cambridge, and in the following year Edinburgh, conferred on him the degree of LL.D. He was connected with a large number of scientific societies, both British and foreign, was collaborator with Todd in the great work on the 'Physiological Anatomy and Physiology of Man' (5 vols. 1845-56), and he also wrote 'Lectures on the Eye' (1849); 'Collected Papers' (1892). His baronetcy was conferred on him in 1884.

Bowman's Root, *Gillenia stipulacea*, a hardy perennial herb of the natural order *Rosaceae*, two to four feet tall, found in rich woods from New York to Georgia, and often planted in shrubberies for their graceful foliage and numerous terminal clusters of white or rose-tinted flowers. The name is also applied to its close relative, *G. trifoliata*, which grows farther south and bears a rather close resemblance to it. Both species are also called Indian physic, American ipecac, Indian hippo, and have been used as tonics and emetics. They are the only species of their genus.

Bowne, bown, Borden Parker, American philosophical writer: b. Leonardville, N. J., 14 Jan. 1847. He was religious editor of the New York 'Independent' 1875-6, becoming professor of philosophy at Boston University in 1876. He has written 'Philosophy of Herbert Spencer' (1874); 'Metaphysics' (1882); 'Principles of Ethics' (1892); 'The Christian Life' (1878); 'The Atonement' (1900), etc.

Bowring, Sir John, English statesman and linguist: b. Exeter, 17 Oct. 1792; d. there, 23 Nov. 1872. While still very young he entered a business house in his native town, and in 1811 became clerk to a London firm, on whose business he traveled to Spain. Soon afterward he started on his own account, and made many journeys to the continent. Having extraordinary linguistic ability he made use of his residence in foreign countries to acquire the different languages, and his first publications consisted of translations, especially of the popular poetry of many of the countries he had visited. At the same time he appeared as a supporter of the Radical politics of the time and of the views of Jeremy Bentham, and acted as editor of the 'Westminster Review' from 1824 till 1830. His public life began in 1828, when he was sent to Holland to make a report on the public accounts of that kingdom. He afterward received similar commissions to France, Switzerland, Italy, Egypt, Syria, and Germany, and the Blue-books which appeared from his pen on these separate occasions are considered as models of their kind. He was member of

Parliament for the Kilmarnock burghs from 1835 to 1837, and for Bolton from 1841 to 1849. In the year last mentioned he accepted the lucrative post of consul at Canton, and his services during the four years that he held this post were so appreciated by the ministry that in 1854, the year after his return, he received the honor of knighthood, and was appointed governor of Hong-kong. As governor of Hong-kong he acted with the same energy that he had manifested when consul at Canton; but the step which he took in ordering Canton to be bombarded to punish the Chinese for an insult offered to the British flag, although approved by Lord Palmerston, then at the head of the government, led to his recall, March 1857. The last public commission he received was in 1860, when he was sent to Italy to report on the commercial relations with the new kingdom. He published 'The Kingdom and People of Siam'; and his 'Autobiographical Reminiscences' appeared in 1877. He will, perhaps, be longest remembered as the author of the familiar hymn, 'Watchman, Tell Us of the Night.'

Bowser, Edward Albert, American mathematician: b. Sackville, New Brunswick, 18 June 1845. He graduated at Rutgers College in 1868, and since 1871 has been professor of mathematics and engineering there. Since 1875 he has had charge of the United States Coast and Geodetic Survey of New Jersey. He has published 'Analytical Geometry' (1880; 10 ed. 1888); 'Differential and Integral Calculus' (1880; 9 ed. 1887); 'Analytical Mechanics' (1884); 'College Algebra' (1888); 'Academic Algebra' (1888); 'Plane and Solid Geometry' (1890); 'Elements of Trigonometry'; 'Treatise on Trigonometry' (1892); 'Logarithmic Tables' (1895); 'Hydromechanics'; 'Roofs and Bridges.'

Bowstring Hemp, the fibre of the leaves of an East Indian plant, or the plant itself, *Sauvœchia zeylanica*, order *Liliaceae*, so named from being made by the natives into bowstrings. The plant is somewhat like a hyacinth in appearance, and has edible roots. The fibre is fine and silky, but very strong, and may become a valuable article in European manufacture. See **HEMP**.

Bowyer, bō'yēr, Sir George, English law writer: b. Oxford, 1811; d. London, 7 June 1883. He was called to the bar in 1839. Converted to Catholicism in 1850, he represented Dundalk 1852-68, and the county of Wexford 1874-80, when his Home Rule principles estranged him from the Liberal party, and, in 1876 led to his expulsion from the Reform Club. He succeeded his father as seventh baronet in 1860. He was author of several able works on constitutional law and Catholic subjects.

Bowyer, William, English printer and classical scholar: b. London, 19 Dec. 1699; d. 18 Nov. 1777. He was admitted a sizar of St. John's College, Cambridge, but left the university without a degree in 1722, and became an associate in the printing trade with his father. In 1729 he obtained the office of printer of the votes of the House of Commons, which he held nearly 50 years. He was subsequently appointed printer to the Society for the Encouragement of Learning, the Society of Antiquarians, of which

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learned body he was admitted a member; and in 1761 Lord Macclesfield procured him the appointment of printer to the Royal Society. In 1767 he was nominated printer of the journals of the House of Lords, and the rolls of the House of Commons. By his will he bequeathed a considerable sum of money, in trust, to the Stationers' Company, for the relief of decayed printers or compositors. His principal literary production was an edition of the New Testament in Greek (1763), with critical notes and emendations. He also published several philological tracts, and added notes and observations to some of the learned works which issued from his press.

Box (*buxus*), a genus of about 20 species of evergreen shrubs or small trees of the natural order *Euphorbiaceae*, natives of northern Africa, southern Europe, Central America, and similar climates in Asia. The species have small opposite leaves, inconspicuous monoecious flowers in terminal or axillary clusters and nearly globular fruits containing two shining black seeds. Several species are planted for ornament as edgings of borders, as hedges and as individual specimens, especially for topiary work, either in the open air or as glasshouse specimens in tubs, etc., for which uses some of them are particularly adapted since they stand shearing well. They are of slow growth and are not very hardy where the winters are at all severe. They are propagated by cuttings. *B. sempervirens*, which attains a height of 25 feet or more, has developed several cultivated varieties of which dwarf box, a favorite edging plant, is probably the best known. The very hard, heavy, light yellow wood exported largely from Spain and Portugal is highly valued for turning, carving, and engraving, and for making musical instruments such as flutes, clarinets, etc. The bright yellow wood of *B. balcarica*, a larger species than the preceding, native to Turkey and certain islands of the Mediterranean, is largely exported from Constantinople for similar purposes to those of the first mentioned, but is inferior.

Box'berry. See GAULTHERIA.

Box Crab, a large thick-shelled crab (*Calappa flamma*), occurring from North Carolina southward, and not uncommon on the Florida reefs. It is four to five inches across, about an inch and a half deep, with large broad, flat claws, which are folded closely in front. It is admirably adapted to resist the violence of the surf.

Box-elder, or Ash-leaved Maple (*Negundo aceroides*), a tree of the natural order *Sapindaceae*, common from the Atlantic coast to the Rocky Mountains. It attains a height of 70 feet, bears pendulous corymbs of staminate flowers and drooping racemes of pistillate blossoms before the pinnate leaves appear. Its wood is inferior for any purposes except for making wood pulp, bowls, pails, etc. It has become very popular in the western United States for windbreaks, fuel, and shade, for which its rapid growth and hardness especially adapt it. It is excellent also to protect other trees until they can care for themselves.

Box-turtle, or Tortoise, a turtle of the American family *Cinosternidae*, having a rather long and narrow shell, in which the under part

(plastron) has its front, and usually also its rear lobes hinged to the fixed central part, so that these ends may be lifted up against the carapace, like doors, thus entirely enclosing the animal within the shell. A familiar example is the mud-turtle (*Cinosternum pennsylvanicum*) of the eastern and southern United States, which is four inches long, has a dusky brown shell, and light dots on its head. Eight or 10 other species are known in the southwest, in Central America, and in Guiana. These turtles are mainly aquatic and carnivorous, and lay only a few eggs, which are covered with a glazed shell, thick, but brittle. Another noteworthy species, sometimes placed in a separate genus (*Arochelys*) because its plastron is only partly movable, is the "musk" or "stink-pot" turtle (*C. odoratum*) of the eastern United States, which emits a musky odor from its inguinal glands. Its dull shell is about 4.50 inches long; it has a long neck, and relatively enormous head marked with two yellow stripes, one above, one below the eye; spends its time mainly in the water; and is disagreeable in odor and disposition. This turtle, however, is kept captive, fattened on swill-milk and eaten in some parts of the country.

Box and Cox, a farce by John M. Morton, the chief characters being the two men from whom the play takes its name. Box and Cox rent from a certain Mrs. Bouncer the same room, but for some time remain ignorant of the fact, as one works by day and the other by night. A holiday discloses the situation, which mutual agreement leaves unaltered.

Box'ers, the name given to the members of a powerful secret society in China. Its avowed object is the driving out from China of all Europeans or other foreigners. The Chinese name for the association is I-ho-ch'uan, which is variously rendered in English. The active efforts of American and European missionaries and the constant encroachments upon Chinese territory by European countries appear to be responsible in great measure for the establishment of the society. The events which precipitated the first demonstrations of the Boxers were the occupation of Kiao-Chau by Germany, the acquisition of Port Arthur by Russia, the taking of Wei-Hai-Wei by England, and the French seizure of Kwang-Chau. Thus the Boxer movement presents itself largely under the aspect of a patriotic uprising against foreign aggression, a fact which goes far to account for the rapidity and thoroughness of its operations in 1900. Early in that year the native population in Shantung were found to be rallying around the standard of the Boxers and adopting its motto, "Uphold the dynasty, drive out the foreigners." The diplomatic corps at Peking called upon the imperial government to suppress the movement. This the court professed its readiness to do, although there was a suspicion, voiced by the British minister, that the Empress Dowager had fallen under the influence of a native party led by T'ung Fuh-shiang and Yu-hsien, and was temporizing with the Boxers. In May 1900 the Boxers began a concerted movement upon the Chinese capital, which, notwithstanding the protests of the diplomatic corps, remained unchecked by the military forces of the empire. These forces being Manchu troops, their loyalty was open to ques-

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tion and their sympathies were alleged to be with the Boxer movement. This, at any rate, is the only explanation offered by the Chinese government for its failure to cope with the uprising. The situation had been rendered additionally threatening by the action of the allies in opening fire upon the forts at Taku. On 17 June the warships of the powers were in force at that port; when fired upon by the Chinese they opened a bombardment. The demonstration before Taku had been deprecated by the United States commander, Admiral Kempff, who did not participate in the bombardment. His warning that hostilities would unite the Chinese against the foreigners was justified by events.

In June 1900, Peking was reduced to a state of siege by the Boxers. The position of the foreigners in the capital became precarious. The entire diplomatic corps was cut off from communication with the outside world. In the emergency the powers hurried military and naval forces to the scene, and an international relief column, under the command of Admiral Seymour of the British navy, moved upon Peking. This force was, however, compelled to retreat, when a short distance beyond Tien-Tsin, with a loss of 300 men. The position of the capital now became desperate. Cut off from communication with the rest of the world, Peking was a scene of turbulence and the centre of wild rumor. It was reported that on 7 July the entire diplomatic corps had fallen a prey to Boxer fury. This rumor was later discredited, the aspect of affairs having been rendered incomprehensible by the receipt of a despatch purporting to emanate from United States Minister Conger, and bearing date 18 July. According to this despatch the diplomatic corps had taken refuge in the British embassy, where they remained in a state of siege by the Boxers, anticipating massacre unless speedily relieved. Meanwhile the allies had concentrated their forces upon Tien-Tsin, capturing the place in the middle of July, but suffering severe loss. The 9th Regiment, United States army, had many casualties, including the loss of its colonel and other officers. The movement had spread in all directions among the Chinese, who, on 16 July, invaded Siberia. Russia at once proclaimed a state of siege in its Asiatic dominions. The powers did not, as yet, give formal recognition to a state of war, chiefly in consequence of the attitude of the United States, which took the ground that the Chinese government had been overpowered by an insurrectionary movement. On 20 July the powers made a categorical demand to be placed in communication with their diplomatic representatives. The authorities at Peking professed their readiness to comply at the earliest possible moment. The international situation was more clearly defined on 23 July by the appeal of China to the United States for the good offices of the latter in dealing with the powers. See CHINA.

Boxing, as now practised and popularly defined, is a contest of skill, endurance, and pluck between two contestants striking at each other with the closed hand, or fist, covered with a soft leather glove stuffed with horsehair. Contests of this nature, in various forms, are probably coeval with man. The sport was much in

vogue among the Greek and Roman athletes, but in place of the modern tendency to deprive it of its more brutal characteristics, as by the use of gloves, the ancients made the punishment as severe as possible by arming the fists of the combatants with strips of rawhide (the *cactus*), which were often knotted and loaded with lead or iron. In the first half of the 18th century rules were formulated to govern such contests in England, and from that time onward the practice of fighting with the fists for prizes or for championships has been reduced well-nigh to a "science." Methods of striking, ring tactics, etc., have developed until mere brute force has had to give way before intelligence; in other words, the head has defeated the hands.

In 1719 one Figg, an English pugilist, who attained such celebrity as to have his portrait painted by Hogarth, brought about some system in the conduct of the prize-ring. His work was continued by Broughton, himself for many years champion of England and a great upholder of the sport. Regular contests were held, with prizes of money and an emblem of championship, usually a belt, which was held on the condition of meeting all comers, on penalty of surrendering it if declining the trial or beaten by the adversary. The use of a belt as such emblem is of very ancient origin, dating back at least to the time of the siege of Troy. Homer, in describing the games at the funeral of Patroclus, mentions a belt in this connection. There is an unbroken record of championships from the time of Figg down. But since 1860, when the British champion, Tom Sayers, fought the American John C. Heenan, fighting with bare knuckles, which had hitherto been the custom, was suppressed, and in its place the use of gloves was adopted. The laws were, however, frequently evaded by the use of skin-tight gloves. At the present time gloves weighing four ounces are used for championship matches.

With the use of gloves came also the adoption of new rules, named, from their framer's title, the Marquis of Queensberry's rules. Under these wrestling and hugging (which had previously been permitted) were prohibited; the time of each round was limited to three minutes, with intervals of one minute between each round; and the former space of 30 seconds within which a man knocked off his feet might recover himself and be brought back to the fighting-line was reduced to 10 seconds.

Under the new conditions boxing has taken a leading rank as a sport and exercise. In the former aspect legislation has been found necessary to restrict its tendency to degenerate into brutality and to lend its aid to gambling and other vices. As an exercise, however, it holds a high place. It is considered the best system of gymnastics for bringing all the limbs under perfect command; rendering every part of the body pliant, flexible, and firm; acquiring a perfect power of keeping the true centre of gravity in every position, and of extending the body and limbs to the extreme length and recovering again without pause or difficulty; and developing the power of breathing and the "staying" qualities. The practice of boxing also gives to those proficient in it a remarkable power of calmly looking danger in the eye, and preserving both the temper and the courage under trying circumstances unruffled. It is

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alleged by the defenders of this sport that it encourages individual and therefore national courage; that it leads to a general sense and sentiment of fair play and honor; and that it discourages and renders infamous the use of the knife and other deadly weapons.

Amateur boxers are divided into seven classes considered according to weight—105 pounds, 115, 125, 135, 145, and 158 pounds, all over the latter weight being classed as "heavy" weights. Among the lighter weights the classes are sometimes termed "bantam" weights, "feather," "light," and "middle" weights. The term "catch weights" implies no restriction as to weight.

The laws governing the practice of the sport vary in different States of the Union and in Great Britain, and cannot be accorded space here. The rules and history may be found in such works as the following: 'Boxiana, or Sketches of Ancient and Modern Pugilism,' by Pierce Egan (London, 4 vols. 1818-24); Michell's 'Boxing' (Badminton Library 1889); 'Cassell's Book of Sports and Pastimes' (New York 1890); Earl's 'Handbook of Boxing' (1893); B. J. Doran's 'Science of Self-Defense' (Toronto 1893); 'Boxing,' in the Oval Series (New York 1896); 'Encyclopædia of Sport' (New York 1902); 'Handbook on Boxing' (New York 1903).

Boxing the Compass, the recital of all the points of the compass in their proper order.

Boxing-day, in England, the day after Christmas, so called from the practice of giving Christmas-boxes or presents on that day. It was made a bank holiday by the act of 1871.

Boxthorn. See LYCTUM.

Boy Bishop, a boy chosen on St. Nicholas' Day, 6 December, by the votes of his fellow-choristers, to act the part of bishop, retaining office until St. Innocent's Day, 28 December. This custom of the mediæval Church, as practised in England, extended to the schools of Winchester and Eton. Dressed in the Episcopal vestments, with mitre, crozier, and ring, the youthful bishop went about attended by a dean and prebendaries and followed by children; went through the forms of blessing and of preaching, more to the entertainment than edification of his hearers. Boy bishops dying during their incumbency, were buried in their Episcopal attire. The custom of electing a boy bishop came to an end in England during the reign of Queen Elizabeth.

Boyaca, bō-yā-kā', United States of Colombia, the most populous department of the republic, lying on the Venezuelan border, southeast of Santander. Mountainous in the west, and consisting of great plains in the east, it produces emeralds, copper, iron, salt, and various cereals. Horses and cattle are raised on the plains. Area, 33,351 square miles; pop. about 720,000. The capital is Tunja.

Boyaca', a town of Colombia, South America, about 60 miles northeast of Bogota. It is inhabited mostly by Indians, contains extensive lime-kilns, and was the scene of a battle, 7 Aug. 1819, between the Spaniards and Gen. Bolivar, which resulted in the defeat of the former, and the establishment of Colombian independence. A college was established here in 1821. Pop. 7,000.

Bo'yar, or **Boiar**, among the Slavic nations, a free landowner independent of any sovereign. It is synonymous with *cech*, *lech*, or *bojarin*, used by several Slavic tribes, such as the Bohemians and Poles. The word boyar was at first especially used by the Bulgarians, Serbs, and Russians, and then was adopted by the Moldavians and Wallachians. It represented the highest social condition, corresponding in certain respects to that of an English peer. In ancient Russia, the boyars were the next after the princes of the blood, or *knazia*, who were all originally petty sovereigns. The boyars formed a kind of supreme political body in the state, and acted as the council (*duma*) of the grand dukes. All the higher offices, civil and military, including the lieutenantcies in the provinces, were held by them. While Russia was still divided into several petty sovereignties, the boyars enjoyed the right of choosing for themselves and for their dependents the prince whom they wished to serve, and to leave the service at their pleasure, without any previous notification. When the Grand Dukes of Vladimir and of Moscow stripped these petty princes of their sovereign rights, and transformed them from vassals into subjects, the dignity of boyars was granted to their families. The boyars had their own military retinue and their clients; and their influence on the masses of the people often equalled that of the grand dukes. The sovereign ukases always contained the sacramental words, "ordered by the Grand Duke (subsequently it was 'by the Czar'), and approved by the boyars." Precedence among the boyars was reckoned according to the date of the title, which was hereditary, and the observance of it was carried so far that in the 16th and 17th centuries any boyar of an older creation refused to serve under a younger one. This struggle for rank was ended by the czar, Alexis Michailowitch Romanoff, who destroyed the official records and diplomas of the boyars. Peter the Great wholly abolished their power and official privileges, and the name now remains only as a historical distinction, and a recollection of the past, in families which once possessed the dignity.

Boyce, Hector. See BÖETHIUS.

Boyce, William, English musical composer: b. London, 1710; d. there, 7 Feb. 1779. He was a pupil of Dr. Maurice Greene, organist of St. Paul's, who at his death bequeathed him a valuable collection of church music, which served as the basis of a splendid publication of that class by Boyce in three folio volumes. Notwithstanding that he was afflicted with deafness, which increased to such a degree as to render him almost insensible of sound, he acquired an uncommon degree of skill in his profession. In 1736 he was chosen organist to the church of St. Michael, Cornhill; and was also appointed composer, and afterward (1758) organist to the Chapel Royal. On his setting to music an ode performed at the installation of his patron, the Duke of Newcastle, as chancellor of Cambridge University in 1749, he was honored with the degree of Doctor of Music; and in 1755 he became master of the king's band. He died of the gout and was interred in St. Paul's Cathedral. His greatest work is the scholarly 'Cathedral Music' (3 vols.

BOYCOTT—BOYD

1760-78), but he will be most generally remembered as the composer of 'Hearts of Oak,' which first occurred in Garrick's pantomime of 'Harlequin's Invasion' (1759). Of his musical compositions a serenata entitled 'Solomon' (1743), is the best.

Boycott. What is popularly known as the boycott is a form of coercion by which a combination of many persons seek to work their will upon a single person, or upon a few persons, by compelling others to abstain from social or beneficial business intercourse with such person or persons. Carried to the extent sometimes practised in aid of a strike it is a cruel weapon of aggression, and its use immoral and anti-social, and the concerted attempt to accomplish it is a conspiracy at common law, and merits and should receive the punishment due to such a crime. It is attempted to defend the boycott by calling the contest between employers and employees a war between capital and labor, and pursuing the analogies of the word to justify thereby the cruelty and illegality of conduct on the part of those conducting a strike. The analogy is not apt, and the argument founded upon it is fallacious. There is only one war-making power recognized by our institutions, and that is the government of the United States and of the States in subordination thereto when repelling invasion or suppressing domestic violence. War between citizens is not to be tolerated, and cannot in the proper sense exist. If attempted it is unlawful, and is to be put down by the sovereign power of the State and nation.

The practices common in a boycott would be outside the pale of civilized war. In civilized warfare women and children and the defenseless are safe from attack, and a code of honor controls the parties to such warfare which cries out against the boycott. Cruel and cowardly are terms not too severe by which to characterize it.

The name was first given to an organized system of social and commercial exclusion employed in Ireland in connection with the Land League and the land agitation of 1880, and subsequently. It took its name from Capt. James Boycott, a Mayo landlord, one of its earliest victims, who as agent for Lord Erne evicted many tenants. A landlord, manufacturer, or other person subjected to boycotting, faces a combination to prevent his buying from or selling to anyone employing labor, etc.; and those refusing to join in a boycott are often threatened with similar interference, loss or injury. Boycotts have been frequently employed in the United States as a means of coercion in labor difficulties. The attitude of courts is not altogether uniform in regard to such combinations. A boycott accompanied by violence is a criminal offense, and such conspiracy is sometimes declared unlawful even when not marked by threats and violence.

Boyd, Andrew Kennedy Hutchison, Scotch clergyman and author: b. Auchinleck, Ayrshire, 3 Nov. 1825; d. London, 2 Nov. 1899. He was educated at King's College, London, and Glasgow University; was ordained in 1851, and was incumbent successively of the parishes of Newton-on-Ayr, Kirkpatrick-Ingrogray, in Galloway, St. Bernard's, Edinburgh, and at the university city of St. Andrews. He early be-

came known as a contributor to 'Fraser's Magazine,' under the signature "A. K. H. B." Many of these contributions were reprinted in book form under the title, 'Recreations of a Country Parson,' of which three series appeared. In 1890 he was moderator of the General Assembly of the Church of Scotland. He also published 'Graver Thoughts of a Country Parson,' 'Counsel and Comfort Spoken from a City Pulpit,' 'Present-Day Thoughts'; 'Memorials of St. Andrew's Sundays'; 'Toward the Sunset'; 'What Set Him Right'; 'The Best Last'; 'Twenty-Five Years of St. Andrew's'; 'St. Andrew's and Elsewhere'; etc.

Boyd, Belle, Confederate spy: b. Martinsburg, W. Va., 9 May 1843; d. Kilbourn, Wis., 11 June 1900. She rendered invaluable aid to the Southern cause by detecting the Federal plans of campaign and revealing them to the Confederates. Gen. "Stonewall" Jackson sent her a letter of thanks.

Boyd, Ellen Wright, American educator: b. Winsted, Conn., 8 Sept. 1833. She has been principal of Saint Agnes' School, at Albany, N. Y., and has published 'Outlines of Religious Instruction'; 'English Cathedrals'; 'Famous Art Galleries.'

Boyd, James P., American lawyer and author: b. Lancaster County, Pa., 20 Dec. 1836. He was admitted to the bar in 1863 and successively edited several Philadelphia newspapers. His published works comprise: 'Lalecca' (1872); 'Envious Merchant' (1874); 'Building and Ruling the Republic' (1884); 'History of the Crusades' (1890); 'Bible Dictionary' (1896); 'Paris Exposition' (1900); and Lives of Grant, Sherman, Sheridan, Blaine, Harrison, McKinley, Emperor William I.; 'Men and Issues' (1892-1900).

Boyd, John Parker, American soldier: b. Newburyport, Mass., 21 Dec. 1764; d. Boston, 4 Oct. 1830. His father was from Scotland, and his mother a descendant of Tristram Coffin, the first of that family who emigrated to America. He entered the army in 1786 as ensign in the 2d regiment, but peace service did not suit his adventurous spirit and in 1789 he went to India. Under Nizam Ali Khan he was given an important command in Madras and at one time had an army of 10,000 men at his disposal. He remained in India several years, in a sort of guerrilla service, and obtaining much favor. Returning home in 1808 he was appointed colonel of the 4th regiment, United States Army. He took part in the battle of Tippecanoe, November 1811; was made brigadier-general 26 August and held that rank throughout the War of 1812. He was at the capture of Fort George, and in the battle of Chrysler's Field, Canada. In 1816 he went to England to secure indemnity for the loss of a valuable cargo of saltpetre captured by an English cruiser, but procured only a single installment of \$30,000. President Jackson appointed him naval officer at Boston in 1830, but his services were almost immediately cut short by his death.

Boyd, Mark Alexander, Scotch writer: b. 1563; d. 1601. He was educated at Glasgow under the superintendence of his uncle, the archbishop of that see, and was equally conspicuous for the alertness of his mind and the turbulence of his disposition. In Paris he reduced himself

to distress by gaming, and then, resuming his studies with ardor, went to Bourges to attend the celebrated civilian Cujacius. To this professor he recommended himself by a compliance with his taste in Latin poetry, which gave a preference to Ennius and the elder Latin poets. After leading a wandering life on the Continent for 14 years he returned to Scotland, and died at his father's seat in Ayrshire. He has received much the same eulogium in regard to graces of person, powers of mind, and various accomplishments as the Admirable Crichton. He is popularly known by his 'Epistolæ Heroïdum,' and his 'Hymni,' published in the 'Deliciæ Poetarum Scotorum.'

Boyd, Mary Stuart, Scottish writer. She was married to Alexander S. Boyd, a well-known illustrator, in 1880, and since 1890 has resided in London. Beside numerous contributions to reviews and other periodicals she has published 'Our Stolen Summer' (1900); 'A Versailles Christmastide' (1901); 'With Clipped Wings' (1902).

Boyd, Thomas Duckett, American educator: b. Wytheville, Va., 20 Jan. 1854. He graduated at Louisiana State University, and has held important posts in the educational institutions of Louisiana. Since 1896 he has been president of Louisiana State University.

Boyd, Zachary, Scottish divine: b. Ayrshire, about 1586; d. about 1653. He received the rudiments of his education at Kilmarnock School, and took the academical course in the College of Glasgow. About 1607 he went abroad and studied at the College of Saumur, France. He was appointed a regent in this university in 1611, and is said to have been offered the principalship, which he declined. He spent 16 years in France, during four of which he was a preacher of the gospel. In consequence of the persecution of the Protestants he was obliged to return home in 1621. There he lived successively under the protection of Sir William Scott of Elie and of the Marquis of Hamilton at Kinneil, it being then the fashion for pious persons of quality in Scotland to retain one clergyman at least as a member of their household. In 1623 he was appointed minister of the large district in the suburbs of Glasgow styled the Barony parish, for which the crypts beneath the cathedral church then served as a place of worship. In this charge he continued for the rest of his life. He filled the office of rector of the University of Glasgow 1634-5 and 1645. In 1629 he published his principal prose work, 'The Last Battell of the Soule in Death; whereby are shown the Diverse Skirmishes that are between the Soule of Man on his Deathbed and the Enemies of our Salvation, carefully digested for the Comfort of the Sicke.' This was reprinted at Glasgow in 1831, with a life of the author by Mr. Neil. He published various other works, chiefly devotional, and left a large quantity of manuscript writings, which are preserved in the Glasgow College library. Among the latter is one entitled 'Zion's Flowers,' consisting of poems on select subjects of Scripture history. It is popularly called 'Zachary Boyd's Bible,' and although it abounds in homely and ludicrous passages, it is not without a fine strain of devotional feeling. Boyd left a large legacy to the Glasgow College.

Boy'dell, John, English engraver, more distinguished as an encourager of the fine arts than on account of his own productions: b. Darrington, Shropshire, 19 Jan. 1719; d. 12 Dec. 1804. He was intended for his father's occupation, which was that of a land-surveyor. Accident having thrown in his way Baddeley's 'Views of Different Country Seats,' he conceived so strong an inclination for engraving that he determined to adopt it as a profession; and accordingly, when above 20, he bound himself apprentice for seven years to Toms, a London engraver. In 1745 he published six small landscapes, and afterward executed as many more views of places in and near London as formed a volume, which he published by subscription. With the profits of this work he established himself as a printseller, and by his liberality to artists in general established a high reputation as a patron of ingenious men. Woollet was employed by him to engrave the celebrated pictures of Niobe and Phaeton, and he furnished other eminent artists with occupation, and was thus enabled to carry on an extensive foreign trade in English prints, which tended greatly to his own emolument and to the credit and advantage of his native country. Having at length established what may be termed an English school of engraving, he next turned his attention to the improvement of the art of painting. With that view he engaged the first artists in the kingdom to furnish the collection of pictures forming the well-known Shakespeare Gallery. The wars arising out of the French revolution having obstructed his continental trade, he was induced in 1804 to solicit an act of Parliament to permit him to dispose of his gallery and paintings by lottery. This he obtained, and lived long enough to see every ticket disposed of, but died before the lottery was drawn.

Boy'den, Seth, American inventor: b. Foxboro, Mass., 17 Nov. 1785; d. Middleville, N. J., 31 March 1870. He was brought up on a farm, and attended a district school. Mechanically inclined, he spent much time experimenting in a blacksmith shop. His first invention was a machine for making nails, and in 1809 he undertook to manufacture both nails and files. Soon afterward he invented a machine for splitting leather, and in 1815, he took it to Newark, N. J., where he engaged in the leather business. In 1816 he invented a machine for cutting brads, and followed this by the invention of patent leather, which he manufactured till 1831, when he began making malleable iron castings, on a system of his own. In 1835 he turned his attention to steam engines; substituted the straight axle for the crank in locomotives; and invented the cut-off now used instead of the throttle valve. In 1849 he went to California, but was unsuccessful, and returned to New Jersey, where he applied himself to farming, and developed a variety of strawberry previously unequalled in size or quality. In 1800, a statue was erected to his memory in Washington Park, Newark, N. J., where he spent the greater part of his life.

Boyè, Martin Hans, Danish-American chemist and genealogist: b. Copenhagen, Denmark, 6 Dec. 1812. He was a graduate from the University of Copenhagen in 1832 and from the medical department of the University of

Pennsylvania in 1844. He came to the United States in 1836 and jointly discovered several chemical compounds, as well as perchloric ether in 1841. In 1845 he discovered the first process of refining cotton-seed oil. He was professor of chemistry at the Central High School in Philadelphia, 1845-59, retiring in the year last named. He has published: 'Pneumatics, or the Physics of Gases' (1856); 'Chemistry, or the Physics of Atoms' (1857).

Boyer, bwä-yä, Alexis, French surgeon: b. Uzerches, Limousin, 1 March 1757; d. Paris, 25 Nov. 1833. Although in his younger years he had to struggle against poverty and disease, he attended the lectures of Louis and Desault, and after a brilliant career as a student obtained the degree of Master of Surgery in 1787. He became successively surgeon to the *Hôpital de la Charité* and to the *Hôtel-Dieu*, and was appointed first surgeon to Napoleon, receiving at the same time the title of baron of the empire, with a dotation of 25,000 francs. He became a member of the Institute in 1825, and was consulting surgeon to Louis XVIII., Charles X., and Louis Philippe. His chief works are: '*Traité d'Anatomie*' (1797-9); '*Traité des Maladies Chirurgicales et des Opérations qui leur Conviennent*' (11 vols. 1814-26). He also contributed to the '*Journal de Médecine*' and the '*Dictionnaire des Sciences Médicales*.'

Boyer, Jean Pierre, zhöñ pē-är, president of the Republic of Hayti: b. Port-au-Prince, 28 Feb. 1776; d. Paris, 9 July 1850. He was a mulatto by birth, but came early to Europe, where he obtained a European education. In 1792 he entered the army, and fought with distinction against the English in San Domingo, but was nevertheless obliged to evacuate the island, to which he did not return till 1802. At first he acted as leader of the mulattoes in the war against the negroes, but afterward effected a union between these in order to prepare the way for the complete independence of the island. When Pétion established a free state in the western part of the island, Boyer undertook the command of the troops which were concentrated in Port-au-Prince. After the death of Pétion, Boyer was elected president in 1818. By his skilful military operations, not less than by his adroit diplomacy, he finally succeeded in uniting the eastern part of the island with the republic, and thus effecting the complete separation of the island from France and Spain in 1825. He also purified the internal administration, raised the financial condition of the republic, and bestowed particular care upon its educational institutions. The contest between mulattoes and negroes, however, still went on, and in the end the latter rose in rebellion against him, and compelled him to leave the island in 1843. He never returned to the place of his birth and of his long-continued activity, but lived for the rest of his life first in Jamaica, and afterward in Paris.

Boyesen, boi'ë-sën, Hjalmar Hjorth, American novelist: b. Frederiksvärn, Norway, 23 Sept. 1848; d. New York, 4 Oct. 1895. After completing his university studies at Christiania, he came to the United States in 1869 and was editor of a Norwegian journal in Chicago. He returned to Europe in 1872 and studied Germanic philology at Leipsic two years; then,

returning to this country, he was professor of German in Cornell University for six years, and then of Germanic languages and literature in Columbia College till his death. His story of Norwegian life, 'Gunnar,' published in the '*Atlantic Monthly*' (1873), and his 'Idyls of Norway and Other Poems' (1883), give proof of his rare imaginative faculty and his deep human sympathies. Besides these, he wrote: 'Tales from Two Hemispheres' (1875); 'A Norseman's Pilgrimage' (1876); 'Falconberg' (1878); 'Goethe and Schiller: Their Lives and Works' (1878); 'Ilka on the Hill-Top' (1881, dramatized 1884); 'Queen Titania' (1882); 'A Daughter of the Philistines' (1883); 'Story of Norway' (1886). Some of his works have been translated into German, etc. He was a founder of the New York Authors' Club.

Boyle, Charles (FOURTH EARL OF ORRERY), English physicist: b. Chelsea, 1676; d. 28 Aug. 1731. While a student at Christ Church, Oxford, he published a new edition of the epistles of Phalaris, of which Dr. Bentley questioning the authenticity, he wrote an answer entitled 'Dr. Bentley's Dissertation on the Epistles of Phalaris Examined,' which produced the famous Boyle and Bentley controversy. On leaving the university in 1700 he was chosen member for Huntingdon; and on the death of his brother succeeded to the earldom, and was soon after elected a knight of the Thistle, and received the command of a regiment. He was subsequently raised to the dignity of a British peer, under the title of Lord Boyle. He retired from court soon after the accession of George I., and in 1722 was sent to the Tower on suspicion of being concerned in Laver's plot, but was discharged after six months' imprisonment. He constantly attended the House of Peers as before, but never spoke, though often employed in drawing up protests. Besides the edition of Phalaris, he published a comedy called 'As You Find It'; a copy of verses to Dr. Garth upon his Dispensary; and a Prologue to Southerne's play of the 'Siege of Capua.' His name of Orrery was given to an astronomical instrument invented by Mr. George Graham, whom he patronized.

Boyle, David, Canadian ethnologist: b. Greenock, Renfrewshire, Scotland, 1 May 1842. He went to Canada in 1856, and was first a blacksmith and then a teacher. He later took up geology and discovered the fossils *murchisonia boylei*, named in his honor. He has, for 15 years, been curator of the Archaeological Museum at Toronto. He has written 'Notes on Primitive Man in Ontario' and similar works.

Boyle, John (EARL OF CORK AND ORRERY), son of Charles Boyle: b. 1707; d. 1762. His earliest publication was a translation of two odes of Horace in 1742, which work was followed in 1751 by his 'Translation of the Epistles of Pliny the Younger, with Observations on Each Letter, and an Essay on Pliny's Life.' This translation advanced his reputation as a polite scholar, but has since been eclipsed by the superior version of Melmoth. In 1754 he made the tour of Italy, and employed himself in collecting materials for a history of Tuscany, which he intended to write in a series of

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letters, 12 only of which have been published since his death. They are written in an agreeable manner, and contain some curious information respecting the Medici family.

Boyle, Richard (EARL OF CORK), English statesman: b. Canterbury, 13 Oct. 1566; d. 15 Sept. 1643. In 1588 he went to Dublin with strong recommendations to persons in power, whose patronage he obtained. The state of Ireland at that time having rendered land very cheap, he took advantage of the circumstance to make some considerable purchases, among which was the estate of Sir Walter Raleigh, consisting of 12,000 acres in the counties of Cork and Waterford, which he obtained on easy terms. He was then appointed clerk of the council under Sir George Carew, the president of Munster, whom he accompanied in various expeditions against the Irish insurgents, in opposition to the English government. On these and other occasions he distinguished himself by his talents and activity, and rapidly augmented his political power and influence. King James I. appointed him privy-councilor for Munster, and afterward for the kingdom of Ireland; in 1616 he was made a peer of that realm by the title of Baron Boyle of Youghall, and in 1620 was created Viscount Dungarvan and Earl of Cork. He was now in the height of his prosperity, living in his castle of Lismore in a style of grandeur more resembling that of a sovereign prince than of a private individual. In 1629 he was made one of the lords justices of Ireland, and in 1631 lord-treasurer of that kingdom. Like most of the English rulers of the sister island, he seems to have employed his power rather for the subjugation than the advantage of the native Irish. He built and fortified towns and castles, and introduced among the people arts and manufactures; but put in force the severe laws of Queen Elizabeth against the Roman Catholics, and transported multitudes of the ancient inhabitants from the fertile province of Leinster to the bogs and deserts of Kerry, supplying their place with English colonists. In 1641 the Earl went to England as a witness against Lord Strafford, then under impeachment, having quarreled with that nobleman during his viceroyalty. Soon after his return home the insurrection of the Irish broke out; on which event he displayed his accustomed activity, enlisting his tenantry under the command of his sons, and taking other measures for the defense of the country. Lord Cork is principally memorable as the founder of a family, several individuals of which have highly distinguished themselves as cultivators of literature, science, and the arts; yet it should not be forgotten that he attained a high degree of contemporary fame, and was designated in the age in which he lived—"The great Earl of Cork."

Boyle, Robert, English philosopher: b. Lismore Castle, Waterford, Ireland, 25 Jan. 1627; d. London, 30 Dec. 1691. He was the seventh son of Richard, the great Earl of Cork. In 1638 he went to Geneva, where he continued to pursue his studies for several years, returning to England in 1644. During this period his father had died, leaving him considerable property. He now went to his estate at Stalbridge, where he devoted himself to the study of physics and chemistry. He was one

of the first members of a learned society founded in 1645, which at first went under the name of the Philosophical College. On account of the political disturbances this society retired to Oxford, but was revived after the Restoration under the name of the Royal Society. Boyle occupied himself at Oxford in making improvements in the air-pump. Like Bacon, he esteemed observation the only road to truth. He attributed to matter merely mechanical properties. Every year of his life was marked by new experiments. We are indebted to him, indirectly, for the first certain knowledge of the absorption of air in calcination and combustion, and of the increase of weight which metals gain by oxidation. He studied the chemical phenomena of the atmosphere, and was thus a predecessor of Mayow, Hales, Cavendish, and Priestley. In all his philosophical inquiries he displayed an accurate and methodical mind, relying wholly upon experiments. While endeavoring to settle his faith, he found those defenses of the Christian religion which had been published before his time, unsatisfactory. In order, therefore, to read the original works, which are considered the foundation of Christianity, he studied the Oriental languages, and formed connections with Pococke, Thomas Hyde, Samuel Clarke, Thomas Barlow, etc. The result of his studies was a conviction of its truth, which was manifested not only by his theological writings, but by his benevolence and generous disinterestedness. He instituted public lectures for the defense of Christianity, devoting an annual sum to the payment of a lecturer. Boyle did much for the support of the mission in India, and caused Irish and Gaelic translations of the Bible to be made and printed at his own expense. To his religious principles were united the purest morals, a rare modesty, and an active benevolence. He was interred in Westminster Abbey. Birch published an edition of his works, five volumes, folio, London, 1744.

Boyle, Roger (EARL OF ORRERY), fifth son of the first Earl of Cork, English soldier: b. Waterford, 25 April 1621; d. 16 Oct. 1679. When only seven years old was created Baron Broghill, by which title he is usually known. He commanded a troop of cavalry raised by his father, was employed in the defense of the castle of Lismore, and displayed his courage and ability on many occasions in the service of Charles I.; on the cessation of whose authority he acted under the parliamentary commissioners in Ireland. When the king was put to death he retired for a while from public life; but being courted by Cromwell, he accepted a commission from him, and assisted him materially in reducing the Irish to subjection. He served his new master with zeal and fidelity, and few persons were more trusted or distinguished by him. Oliver becoming Protector, made Lord Broghill one of his privy-council and a member of his House of Lords. In 1656 he sent him to Scotland, with a commission to govern there with absolute authority for one year; and his conduct was such as proved satisfactory both to the Scots and the Protector. On the death of Cromwell, becoming aware of the approaching restoration of regal power, he exerted himself with such dexterity and success in promoting it as to obtain much credit for his conduct.

Charles II. rewarded him with the title of Earl of Orrery, and he was appointed one of the lords justices for Ireland.

Boyle, Virginia Frazer, American novelist: b. Chattanooga, Tenn. She was the daughter of Charles Frazer, a Confederate officer, and married Thomas R. Boyle, a lawyer of Memphis. She has published: 'Brokenburne'; 'Devil Tales' (1900); and has written extensively for periodicals.

Boyle Lectures, a series of discourses so named from the founder, Robert Boyle (q.v.), who left a bequest amounting to \$250 annually for this purpose, the theme of the lectures to be Christian apologetics. The first series was given in 1692 by Richard Bentley. Among Boyle lecturers whose discourses have been published since 1860 are: J. D. Maurice, C. Merivale, E. H. Plumptre, J. A. Hessey, and H. Wace. The lectures of this course are given annually in a series of eight at the Church of St.-Mary-le-Bow, London.

Boyle's Fuming Liquor, so called from having been invented by Robert Boyle (q.v.), a fetid, yellow liquid, obtained by distilling sal ammoniac with sulphur and lime. It is sometimes used in medicine under the name of *liquor fumans boylii*.

Boyle's Law. See GAS.

Boylston, Zabdiel, American physician: b. Brookline, Mass., 1680; d. Boston, 1 March 1766. He studied medicine, settled in Boston, and acquired a prosperous practice. In spite of the almost unanimous opposition of the medical profession and part of the public, he introduced the practice of inoculation for smallpox, having become a firm believer in it. Out of 286 persons inoculated in 1721-2 only six died, and he had the satisfaction of seeing the practice become general in New England long before it became so in England. He visited England in 1725 and was elected a Fellow of the Royal Society. Besides some papers published in the Transactions of that Society he wrote: 'Historical Account of the Smallpox Inoculated in New England, Upon All Sorts of Persons, Whites, Blacks, and of all Ages and Constitutions' (2d ed. 8vo London 1726; reprinted, Boston, 1730).

Boyne, boin, a river of Ireland, which rises in the Bog of Allen, County Kildare, and flows northeast through Meath to Drogheda, below which it enters the Irish Sea. It is navigable for barges up to Navan. The Boyne will ever be memorable in English history for the important victory gained on its banks about three miles above Drogheda, 1 July 1690, by the forces under the command of William III., over those of James II. Though James' personal courage was beyond all question, he, on this occasion, allowed the prudence of the sovereign to outweigh the impulses of the soldier. Of his troops 1,500 were killed and wounded, while William lost barely 500 men. In 1736 an obelisk, 150 feet high, was erected at Oldbridge, on the site of the battlefield, in commemoration of this victory. See ORANGEMEN.

Boynton, Edward Carlisle, American soldier: b. Vermont, about 1825; d. Newburg, N. Y., 13 May 1893. He was graduated from the Military Academy at West Point, N. Y.,

entered the artillery service, and in the war with Mexico was wounded at the battle of Cherubusco. He was professor of chemistry at West Point, 1848-55, and in the University of Mississippi, 1858-61. He wrote a 'History of West Point' (1863); and a 'History of the United States Navy.'

Boynton, Henry Van Ness, American army officer: b. West Stockbridge, Mass., 22 July 1835. He was graduated from Kentucky Military Institute in 1858; and was retained in the faculty of that institution. On the outbreak of the Civil War he resigned his office, and 27 July 1861 was commissioned major in the 35th Ohio Volunteers; was made lieutenant-colonel, 19 July 1863; and commanded the regiment at the engagement of Missionary Ridge, where he was severely wounded. He also commanded at Buzzard's Roost, and was brevetted brigadier-general for gallantry at Chickamauga and Chattanooga. After the war he resided in Washington and was a newspaper correspondent. He published 'Sherman's Historical Raid' and 'The Memoirs in the Light of the Record, a Review Based upon Compilations from the Files of the War Office' (1875). He headed the opposition in 1887 to President Cleveland's order for the return of the Confederate battle flags. In 1894 he received a Congressional Medal of Honor for distinguished bravery at Missionary Ridge, and in 1898 was appointed a brigadier-general of volunteers for the war with Spain, and was in command of Camp Thomas, Chickamauga, during the war. He became chairman of the Chickamauga and Chattanooga National Military Park Commission and president of the board of education of the District of Columbia.

Boy's Clubs, organizations in which boys constitute the membership. Among clubs formed by boys on their own initiation, those for games and athletics seem to predominate very largely. Clubs for hunting, fighting, etc., are also popular. Sometimes the organizations have a distinctly literary or musical character and sometimes they are chiefly social in their nature. Numbers of clubs are formed for industrial purposes, but judging from statistics secret societies do not meet with as great a degree of favor as would naturally be supposed. These societies for boys are organized by adults; the aims are in general to keep boys from bad surroundings and stimulate them to nobler ideals of life, to refine their taste and encourage them in habits of thrift, industry, and study. Clubs in large cities sometimes have hundreds of members and provide fine buildings, in which opportunity is offered for a variety of activities ranging from manual training and other forms of instruction to social entertainment. The religious interests of the boys are also cared for in various ways. The clubs connected with social settlements are often small, thus affording a better opportunity for reaching the boys personally, an end difficult of achievement in societies with large membership. See Forbush, 'How to Keep Boys' (1900); Forbush, 'The Boy Problem' (1901); Newman, 'The Boys' Club in Theory and Practice' (1900).

Boy'ton, Paul, Irish-American swimmer: b. Dublin, 29 June 1848. He served in the United States navy, 1863-5, and was connected

with the United States life-saving service, 1867-9. He invented a rubber life-preserving suit, in which, in 1874, he leaped from a vessel off the coast of Ireland, and, after remaining seven hours in the water, reached land safely. On 28 May 1875 he crossed the English Channel in this suit, swimming across in 24 hours. In 1876 he made the run from the Bayou Goula to New Orleans, La., 100 miles, in 24 hours. In May, the same year, he descended the Danube from Linz to Budapest, 460 miles, in six days. Later he went from Oil City, Pa., to the Gulf of Mexico, 2,342 miles, in 80 days, being exposed at first to great cold and later to extreme heat. In November 1879, he descended the Connecticut River from Canada to Long Island Sound. On 17 Sept. 1881, he started from Cedar Creek, Mont., to swim to St. Louis, Mo., and accomplished the long journey, 3,580 miles, 20 November. In 1888 he made a voyage down the Ohio River. He published an account of his adventures under the title, 'Roughing It' (1886).

Boz, bōz, a pseudonym used by Charles Dickens in the publication of 'Sketches by Boz.' That the pronunciation of this name now in vogue is not correct is shown by Dickens' explanation of its origin. A younger brother of the author had in childhood received from the latter the nickname Moses, "which being facetiously pronounced through the nose became Böses, and being shortened became Bōz."

Bozeman, bōz'măn, Mont., a city and county-seat of Gallatin County, on the Northern P. R.R., in the midst of a region of valuable ores, such as gold, silver, coal, and iron. Its industries are breweries, flour and lumber mills, brickyards, stone quarries, and the like, and it contains the State College of Agriculture and Mechanic Arts, opened in 1893. Pop. (1900) 3,419.

Bozen, a town of the Austrian Tyrol, 32 miles northeast of Trent; situated in a hilly region at the junction of the Talfer and Eisak, and on the Brenner Railway. The situation of the town in relation to Germany, Switzerland, and Italy, makes it an important trade centre. There are four annual fairs; the canning of fruit and vegetables is carried on, and manufactures of silk and linen. Among the public buildings are a Gothic church, castle, monastery, and gymnasium. Pop. (1900) 13,632.

Bozman, bōz'măn, **John Leeds**, American historian and jurist: b. Talbot County, Md., 25 Aug. 1757; d. there, 23 April 1823. He studied law in London, and afterward practised that profession in his native State, where for several years he acted as deputy attorney-general. His legal reputation, however, rests upon the various law tracts which he published from time to time, as legal questions arose in the courts. He wrote a 'Historical and Philosophical Sketch of the Prime Causes of the Revolutionary War,' in which he praised Washington, and condemned Franklin; but it was suppressed. During the administration of Washington and the elder Adams, he wrote much in the journals of the day, and at a later period in Dennie's 'Portfolio.' In 1822 he published at Washington an essay on the colonization society, in which he discussed the question of the origin of races. His literary reputation

chiefly rests on his 'History of Maryland, from the Earliest Settlement in 1633, to the Restoration in 1660,' a posthumous work, published in 1836, under the auspices of the general assembly of that State.

Boz'rah, bōz'ra, an ancient city of Palestine, east of the Jordan, and about 80 miles south of Damascus. It was the capital of Og, king of Bashan, and subsequently belonged to the tribe of Manasseh. Early in the Christian era, it became a flourishing place, and was long a great emporium of trade. It is now a scene of ruins.

Bozzaris, Marcos, măr'cōs bō'tsā-rēs, a hero of the Greek war of Independence against the Turks: b. Suli, in Epirus, about 1790; d. Missolonghi, 1823. He was descended from a Suliote family renowned for its bravery, and after the fall of Suli retired to the Ionian Islands, from whence he made a vain attempt to deliver his native country. He then entered an Albanian regiment in the French service, and in 1813 became a member of the Hetæria, a society formed for national regeneration. In 1820, when the Turks were carrying on war against Ali Pasha, the latter sought aid from the exiled Suliotes, and Marcos Bozzaris returned to Epirus. On the outbreak of the war of independence he at once joined the Greek cause, and distinguished himself as much by his patriotism and disinterestedness as by his military skill and personal bravery. In 1822 he took part in the war which was going on in western Greece, and acquired special renown by his defense of Missolonghi. In the summer of 1823, when he held the command-in-chief of the Greek forces in that port, he was dangerously wounded at a night attack on the camp of the Pasha of Scutari, near Karpenisi, and died soon after. His deeds are still celebrated by the Greeks in many popular songs. Through Halleck's spirited poem, 'Marco Bozaris,' his name and fame have been made familiar to several generations of American school boys.

Brabançonne, bra-băn-sŭn, the national song of the Belgians during the revolution of 1830, composed by Jenneval, at that time an actor at the theatre of Brussels, and set to music by Campenhout. Every verse of the song ends with the refrain:

"La mitraille a brisé l'orange
Sur l'arbre de la liberté."

Brabançons, bra-băn-sŏn, a class of adventurers and lawless soldiers in the Middle Ages, ready to fight for pay on either side and in any quarter. They derive their name from Brabant, the chief nursery of these troops, and were particularly notorious in France in the 12th century.

Brabant, bră'bănt, or bra-bănt', the central district of the lowlands of Holland and Belgium, extending over an area of 4,341 square miles, from the left bank of the Waal to the sources of the Dyle, and from the Meuse and the plains of Limburg to the lower Scheldt. In the Middle Ages it formed a separate independent duchy, called Lower Lorraine. It is divided at present between the kingdoms of Holland and Belgium, into three provinces: (1) Dutch or North Brabant, with an area of 1,980 square miles; (2) the Belgian province

of Antwerp, with an area of 1,093 square miles; (3) the Belgian province of South Brabant, with an area of 1,268 square miles. The country is comprehended in a plain, gently sloping to the northwest, occupied in the north by heathy and marshy tracts, and in the south passing into the gentle rising ground which forms the first ascent of the forest of Ardennes. It is copiously watered by the Meuse in the north and the Scheldt in the south, in the former of which the internal transit is furthered by means of canals, among others the South William and the Breda canals, and in the latter by railways, which have their point of union at Mechlin. Under the influence of a northerly, indeed, and moist, but in general healthful and mild climate, the great fertility of the soil renders agriculture and the raising of cattle the principal and most profitable employment of the inhabitants. With this is associated the general diffusion of an active industry, which supports an extensive trade, consisting chiefly of lace, cotton, woolen, and leather goods.

Through Cæsar's campaigns the Romans became acquainted with the inhabitants of Brabant as a mixed race of Germans and Celts. The Menapians, particularly, inhabiting the country between the Rhine, the Meuse, and the Scheldt, made, as the most powerful and warlike among the various tribes, a gallant though ultimately ineffectual resistance to the Roman arms, by whose conquests this portion of Lower Germany was incorporated with the province of Gallia Belgica. In the 5th century the Franks gained possession of Brabant, which in the sixth was, at the partition of the Frank kingdom, assigned to the primitive country of Austrasia; in the 9th century it was united to Lorraine; and on the division of the latter, in 870, became the property of France, from which, however, in the commencement of the 10th century, it was transferred by Henry I. again to Lorraine; in 959 to Lower Lorraine, and thus to Germany. In the beginning of the 11th century it was separated from Lorraine, on Duke Otho, the son of Charles the Fat, who had been invested by the Emperor Otho with Lower Lorraine, dying childless in 1005. After this several Counts of Ardennes and Godfrey of Bouillon possessed it till 1076; the Emperor Henry V. mortgaged it to Godfrey the Bearded, of the family of the Counts of Louvain and Brussels, whose house reigned over Brabant to the middle of the 14th century. As early as 1190 we find the title of Duke of Brabant, in which the former title of Duke of Lower Lorraine or Lothier was gradually absorbed. Under the government of its own dukes Brabant gained rapidly in power and independence, but was engaged in numerous contests with its neighbors, and shifted much in its leanings between Germany and France. Of the six dukes of Brabant, Henry I., II., and III., and John I., II., and III., there are more especially to be mentioned John I., who, by the celebrated battle of Wöringen (1288), united Limburg to Brabant, and is also renowned in Germany as a minnesinger or troubadour, and John III., who, in 1349, received from the Emperor Charles IV. the important privilege of a free judicature, under the name of the Brabantine Golden Bull, in consequence of which his subjects ceased to be amenable to any foreign

jurisdiction. With John III. the male heirs of the family of the Counts of Louvain became extinct in 1355, and, by the bequest of his daughter, Joanna, who reigned till 1406, and married Wenceslaus of Luxemburg, Brabant came into the possession of the house of Burgundy, and in the first instance to Antony of Burgundy, Joanna's grand-nephew, and second son of Philip the Bold. On Antony's death at the battle of Agincourt, in 1415, and his two successors, his son, John IV., and his brother, Philip, Count of St. Pol, dying childless respectively in 1427 and 1430, Brabant, as the inheritance of Philip the Good, became formally incorporated with the dominions of the house of Burgundy. In this state, however, it did not long continue, and, by the marriage of Mary of Burgundy with the Emperor Maximilian, was transferred to the house of Austria, and subsequently to the Emperor Charles V., who abdicated in favor of his son, Philip II., of Spain. The persecuting edict of the latter, and the Duke of Alva's cruelties, excited a revolt in Brabant, but it was only the northern portion (Hertogenbosch) which succeeded in asserting its independence, and in 1648 was incorporated with the United Provinces under the name of the Generality Territory, while South Brabant remained till 1714 in the possession of the Spaniards. On the extinction of the Spanish-Austrian line in the latter year, Brabant, with the other southern provinces of the Netherlands, reverted to the imperial house of Austria, which, however, was unable long to retain it in peace. On a violent contest breaking out under the Emperor Joseph II., as to the explanation of the provincial privileges which Brabant possessed under the Joyeuse Entrée (q.v.), and the consequent dismissal of the assembly of the states of Brabant and Limburg, the Brabantines assembled of their own authority, and boldly pronounced the separation of Brabant from the supremacy of the house of Austria. Leopold II. settled the dispute after Joseph's death by granting their ancient privileges to the people of Brabant. See BELGIUM.

Bra'bournne, Edward Huggessen Knatchbull-Huggessen, Lord, English juvenile story writer: b. Mersham Hatch, Kent, 29 April 1829; d. 6 Feb. 1893. His literary fame is due mostly to his stories for children, including: 'Crackers for Christmas' (1870); 'Moonshine' (1871); 'Stories for My Children' (1869); 'Tales at Tea Time' (1872); 'Queer Folk' (1873); 'River Legends' (1874); 'Uncle Joe's Stories' (1878); 'Friends from Fairyland' (1885). He also published 'The Truth About the Transvaal' (1881), and edited the 'Letters of Jane Austen,' his great-aunt (1885).

Braccio da Montone, Andrea, ân-dră-ă bră-chō-dă-môn-tō-ně, Italian captain: b. Perugia, of the illustrious family of the Fortebracci, 1368; d. 1424. He early embraced the profession of arms, and entered the service of Ladislas, king of Naples, under the promise that he, if successful, would make him master of Perugia; but when the Perugians, determined to keep out Braccio, offered to open their gates to Ladislas, if he would retain it for himself, he broke faith with Braccio, and accepted their terms. Braccio next served under Florence, afterward attaching himself to

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The body of Brachiopods is divided into two parts, the anterior or thoracic, comprising the main body-cavity in which the arms and viscera are contained, and the caudal portion, that is, the peduncle. The part of the body in which the viscera lodge is rather small in proportion to the entire animal, the interior of the shell being lined with two broad lobes, the free edges of which are thickened and bear setæ, as seen distinctly in Lingula. The body-cavity is closed anteriorly by a membrane which separates it from the space in which the arms are coiled up. The pallial chamber is situated between the two lobes of the mantle (*pallium*) and in front of the membrane forming the anterior wall of the body-cavity. In the middle of this pallial chamber the mouth opens, bounded on each side by the base of the arms. The latter arise from a cartilaginous base, and bear ciliated tentacles, much as in the worm Sabella. In Lingula, Diseina, and Rhynchonella, they are developed, in a closely wound spiral, as in the genuine worms (Amphitrite). In Lingula the arms can be partially unwound, while in Rhynchonella they can not only be unwound but protruded from the pallial chamber. In many recent and fossil forms the arms are supported by loop-like solid processes of the dorsal valve of the shell, but when these processes are present the arms cannot be protruded beyond the shell. The tentacles or cirri on the arms are used to convey to the mouth particles of food, and they also are respiratory in function, there being a rapid circulation of blood in each tentacle, which is hollow, communicating with the blood-sinus or hollow in each arm, the sinus ending in a sac on each side of the mouth.

The digestive system consists of a mouth, œsophagus, stomach, with a liver-mass on each side, and an intestine. The mouth is bordered by two membranous, highly sensitive and movable lips. The stomach is a simple dilatation of the alimentary canal, into which empty the short ducts of the liver, which is composed of masses of cæca. The liver originally arises as two diverticula or offshoots of the stomach. The short intestine ends in a blind sac or in a vent, and is, with the stomach, freely suspended in the perivisceral cavity by delicate membranes springing from the walls of the body.

The nervous system consists of two small ganglia above, and an infrœsophageal pair of larger ganglia, and there are two elongated ganglia behind the arms, from which nerves are given off to the dorsal or anterior lobe of the mantle.

The larva is top-shaped (trochosphere) and is quite active, swimming rapidly about in every direction.

While in their development the *Brachiopoda* recall the larvæ of the true worms; they resemble the adult worms in the general arrangement of the arms and viscera, though they lack the highly developed nervous system of the Annelids, as well as a vascular system, while the body is not jointed. On the other hand they are closely related to the Polyzoa, and it seems probable that the Brachiopods and Polyzoa were derived from common low vermician ancestors, while the true Annelids probably sprang independently from a higher ancestry. They are also a generalized type, having some molluscan features, such as a solid shell, though having

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Brachial Plexus. See NERVES.

Brachiopods, or **Brachiopoda**, brăk'-i-ō-pōds, the class of shelled worms, formerly placed among mollusks. The class is named *Brachiopoda* from the feet-like arms, fringed with tentacles, coiled up within the shell, and which correspond to the lophophore of the Polyzoa and the crown of tentacles of the Sabella-like worms. The shell, which lives attached to rocks, is in shape somewhat like an ancient Roman lamp, the ventral and larger valve, being perforated at the base for the passage through it of a peduncle by which the animal is attached to rocks. The shell is secreted by the skin (ectoderm), and is composed of carbonate (Terebratulina) or largely (Lingula) of phosphate of lime.

The body of Brachiopods is divided into two parts, the anterior or thoracic, comprising the main body-cavity in which the arms and viscera are contained, and the caudal portion, that is, the peduncle. The part of the body in which the viscera lodge is rather small in proportion to the entire animal, the interior of the shell being lined with two broad lobes, the free edges of which are thickened and bear setæ, as seen distinctly in *Lingula*. The body-cavity is closed anteriorly by a membrane which separates it from the space in which the arms are coiled up. The pallial chamber is situated between the two lobes of the mantle (*pallium*) and in front of the membrane forming the anterior wall of the body-cavity. In the middle of this pallial chamber the mouth opens, bounded on each side by the base of the arms. The latter arise from a cartilaginous base, and bear ciliated tentacles, much as in the worm *Sabella*. In *Lingula*, *Diseina*, and *Rhynchonella*, they are developed, in a closely wound spiral, as in the genuine worms (*Amphitrite*). In *Lingula* the arms can be partially unwound, while in *Rhynchonella* they can not only be unwound but protruded from the pallial chamber. In many recent and fossil forms the arms are supported by loop-like solid processes of the dorsal valve of the shell, but when these processes are present the arms cannot be protruded beyond the shell. The tentacles or cirri on the arms are used to convey to the mouth particles of food, and they also are respiratory in function, there being a rapid circulation of blood in each tentacle, which is hollow, communicating with the blood-sinus or hollow in each arm, the sinus ending in a sac on each side of the mouth.

The digestive system consists of a mouth, œsophagus, stomach, with a liver-mass on each side, and an intestine. The mouth is bordered by two membranous, highly sensitive and movable lips. The stomach is a simple dilatation of the alimentary canal, into which empty the short ducts of the liver, which is composed of masses of cæca. The liver originally arises as two diverticula or offshoots of the stomach. The short intestine ends in a blind sac or in a vent, and is, with the stomach, freely suspended in the perivisceral cavity by delicate membranes springing from the walls of the body.

The nervous system consists of two small ganglia above, and an infrœsophageal pair of larger ganglia, and there are two elongated ganglia behind the arms, from which nerves are given off to the dorsal or anterior lobe of the mantle.

The larva is top-shaped (trochosphere) and is quite active, swimming rapidly about in every direction.

While in their development the *Brachiopoda* recall the larvæ of the true worms; they resemble the adult worms in the general arrangement of the arms and viscera, though they lack the highly developed nervous system of the Annelids, as well as a vascular system, while the body is not jointed. On the other hand they are closely related to the Polyzoa, and it seems probable that the Brachiopods and Polyzoa were derived from common low vermician ancestors, while the true Annelids probably sprang independently from a higher ancestry. They are also a generalized type, having some molluscan features, such as a solid shell, though having

nothing homologous with the foot, the shell-land or odontophore of mollusks.

In accordance with the fact that the Brachiopods are a generalized type of worms, the species have a high antiquity, and the type is remarkably persistent. The *Lingula* of our shores (*Glottidia pyramidata*) lives buried in the sand, where it forms tubes of sand around the peduncle, just below low-water mark from Chesapeake Bay to Florida. It has remarkable vitality, not only withstanding the changes of temperature and exposure to death from various other causes, but will bear transportation to other countries in sea-water that has been unchanged. Living *lingulae* have been carried from Japan to Boston, Mass., the water in the small glass jar containing the specimens having been changed but twice in four months. The living species of this cosmopolitan genus differ but slightly from those occurring in the lowest fossiliferous strata. Between 80 and 90 living species are known, most of them living, except *Lingula*, which is tropical, in the temperate or arctic seas, while nearly 2,000 fossil species are known. The type attained its maximum in the Silurian age, and in Palaeozoic times a few species, as *Atrypa reticularis*, extended through an entire system of rocks and inhabited the seas of both hemispheres.

Consult Littel-Eastman, 'Text-book of Palaeontology' (New York 1900).

Bracht, bräht, Felix Prosper Eugen, German artist, b. Morges, Switzerland, 1842. He is best known as a landscape artist. He studied at Carlsruhe and Dusseldorf, and in 1882 was appointed a professor in the Berlin Academy. Among notable paintings by him are 'Stormy Evening on Rügen'; 'Moonlight Night in the Desert'; 'Nightfall on the Dead Sea.' The last named work, now in the National Gallery of Berlin, is considered his best.

Brachvogel, Emil, ä'mël brah'fō-gël, German novelist and dramatist: b. Breslau, 1824; d. 1878. He is best known by his drama, 'Narcisse' (1857), which attained many editions and was translated into various European tongues. 'Beaumarchais' (1865); 'Benoni' (1860); and 'Glencarty' (1872).

Brachyura, brāk-ī-ū'ra, a sub-order of decapodous crustaceans, containing those families in which the abdomen is converted into a short jointed tail folding closely under the breast. The common crab is a familiar example of this group. See CRUSTACEA.

Brack'en (*Pteris aquilina*), a well-known species of polypodiaceous fern, forming the type of the sub-family *Pteridæ*. It has a black, creeping rhizome, from which are sent up large, handsome bipinnate fronds. The sori are arranged along the margins of the pinnules, and are covered by a false indusium formed of the reflexed margin. The bracken or brake is very common in Great Britain where it frequently covers large extents of country. Its root-stock was at one time used for food, but it is neither palatable nor nutritious; that of a New Zealand species (*P. esculenta*) is better suited for this purpose. Various medicinal virtues have been at one time or another ascribed to it, but it is not now used in medicine. The ash produced by burning the fronds has been employed in making soap. Other species are met

with in various parts of the world. In verse the word is often loosely employed to indicate ferns in general.

Brack'enbury, Charles Booth, English soldier and military writer: b. Bayswater, Middlesex, 7 Nov. 1831. He served in the Crimean war in 1855; accompanied the Prussian army in the war with Austria (1866), and the Franco-Prussian war (1870-71), and was with the Russian army in the Russo-Turkish war (1877-8). His works include 'European Armaments' (1867); 'The Winter Campaign of Prince Frederick Charles in 1870-71'; 'Reforms of the French Army' (1874), etc.

Brackenbury, Sir Henry, English soldier: b. Bolingbroke, Lincolnshire, September 1837. He entered the Royal Artillery in 1856, served in the central Indian, Ashanti and Zulu campaigns and was made lieutenant-general in 1888, and director-general at the war office in 1899. He has published 'Fanti and Ashanti' (1873); 'Narrative of the Ashanti War' (1874); 'The River Column' (1885).

Brack'enridge, Henry Marie, American author: b. Pittsburg, Pa., 11 May 1786; d. there 18 Jan., 1871. He was educated by his father, H. H. Brackenridge (q.v.) and admitted to the bar 1806. In 1811 he descended the Mississippi River in a 'keel-boat' to New Orleans, and was soon appointed deputy attorney-general for the then territory of Orleans, becoming district judge in 1812. In 1817 he was secretary to the commission sent to the South American republics, and in 1821 was appointed U. S. judge for the western district of Florida, holding it until he removed to Pittsburg in 1832. His knowledge of the French and Spanish languages and laws made him of considerable service to the government in all affairs connected with the Louisiana and Florida purchases. He wrote 'Views of Louisiana in 1810' (1812); 'Letter to Mr. Monroe. By an American'; 'Voyage to South America in 1817-18' (1818); 'History of the Late War [1812] between the United States and Great Britain'; 'Recollections of Persons and Places in the West' (1834); 'Essays on Trusts and Trustees' (1842); 'History of the Western Insurrection' (1850), a vindication of his father's share in that affair.

Brackenridge, Hugh Henry, American jurist: b. near Campbellton, Scotland, 1748; d. Carlisle, Pa., 25 June 1816. He came with his father to the United States at the age of five, and was graduated from Princeton in 1771. During the American Revolution he was a chaplain in the army. After being admitted to the bar he removed to Pittsburg, became prominent in his profession, and during the "Whisky Insurrection" (1794) was influential in bringing about a settlement between the government and the malcontents. In 1799 he was appointed to the supreme bench of Pennsylvania. A man of literary tastes, he wrote a number of pieces much thought of in their day. At his graduation he wrote (with Philip Freneau) a poetical dialogue 'The Rising Glory of America.' Other works by him are 'Incidents of the Insurrection in Western Pennsylvania' (1795); 'Law Miscellanies' (1814); 'Modern Chivalry, or the Adventures of Captain Farrago and Teague O'Regan, His Servant,' a political satire and his best work (1st Pt. 1796; 2d, 1806).

Bracket, a short piece or combination of pieces, generally more or less triangular in outline, projecting from a wall or other surface. They may be either of an ornamental order, as when designed to support a statue, a bust, or such like, or plain forms of carpentry, such as support shelves, etc. Brackets may also be used in connection with machinery, being attached to walls, beams, etc., to sustain a line of shafting.

Brack'ett, Anna Callender, American educator: b. Boston, 21 May 1836. She taught in various normal schools, being the first woman principal of such an institution, and was principal of a private school for girls in New York for 20 years. She has published 'Education of American Girls' (1874); 'Philosophy of Education,' from the German (1886); 'Technique of Rest' (1892); 'Woman and the Higher Education' (1893).

Brackett, Frank Parkhurst, American mathematician: b. Provincetown, Mass., 1865. He graduated at Dartmouth College in 1887, and since 1890 has been professor of mathematics and astronomy at Pomona College, Claremont, California. He has written several important mathematical and meteorological papers.

Brackett, Gustavus B., American pomologist: b. Unity, Maine, 24 March 1827. He served in the Civil War, and, at its close, took up the study of horticulture and pomology. He served as an expert at the Paris Exposition (1878) and the Chicago World's Fair (1893), after which he became chief of the Division of Pomology in the United States Department of Agriculture.

Brackett, John Quincy Adams, American lawyer: b. Bradford, N. H., 8 June 1842. After studying law at the Harvard Law School he began the practice of his profession in Boston. He sat for several terms in the Massachusetts legislature (1877-82 and 1884-7), being speaker of the House (1885-7); was lieutenant-governor of the State (1887-90), and governor of Massachusetts (1890-91).

Bracquemond, Joseph Felix, zhō-zěf fā-lēks brak-mōn, French artist and engraver: b. Paris, 1833. He first exhibited in the Salon of 1852 and his etchings and reproductions of noted masters speedily brought him into notice. His portraits are especially prized and as an etcher he is represented by over 800 plates. He has invented a new method of china decoration and has done much work for the porcelain establishments at Limoges.

Bract, a leaf, from the axil of which a flower or flower-stalk develops, and thus distinguished from the ordinary leaf, from the axil of which the leaf-bud proceeds. Bracts may thus be entirely similar to the ordinary leaves of a plant, in which case they are called leafy bracts; but very commonly they are somewhat changed in form, and although they may be sometimes divided, they are for the most part entire, even when the ordinary leaves are divided. In some cases they are so much changed in form as to be mere scales or threads, and sometimes they are not developed at all, in which case the inflorescence is said to be ebracteate. Owing to the different ways in which the bract appears, it may in some plants be con-

founded with the calyx, in others with the corolla. When the flowers of a plant are sessile, the bracts are often applied closely to the calyx, and are thus apt to be confounded with it; and when the bracts are colored, they are apt to be mistaken for parts of the corolla. When the inflorescence of a plant is branching, subordinate flower-stalks proceeding from one main flower-stalk, bracts are often seen at the base of the former, and these are called bracteoles. A spathe is a kind of large bract.

Brac'teates, thin coins of gold or silver, with irregular figures on them, stamped upon one surface only, so that the impression appears raised on one side, while on the other it appears hollow. They were largely circulated under Otho I., emperor of Germany, and derive their name from *bractea*, signifying leaf of gold or other metal. They are of importance as illustrating history. Bracteated coins, or *bractcati nummi*, is a term used to signify coins or medals covered over with a thin plate of some richer metal. They were usually made of iron, copper, or brass, plated over and edged with gold or silver leaf.

Brac'ton, Henry de, one of the earliest writers on English law, flourished in the 13th century. He studied civil and canon law at Oxford, and about the year 1244, Henry III. made him one of his judges itinerant. Some writers say that he was afterward chief-justice of England; but his fame at present is derived from his legal treatise entitled 'De Legibus et Consuetudinibus Angliæ,' first printed in 1569 (folio). The quarto edition of 1640 was merely a reprint of the first. In 1878-83 Sir Travers Twiss issued a recension and translation in six volumes. See Scrutton, 'Influence of the Roman Law on the Law of England' (1885).

Brad'bury, William Batchelder, American musician: b. York, Me., 6 Oct. 1816; d. Montclair, N. J., 7 Jan. 1868. In 1840 he began teaching in New York and Brooklyn. He organized free singing schools and his concerts, at which the performers, all children, sometimes numbered 1,000, became very popular. In 1847-8 he went to Europe, where he pursued musical studies under Hauptmann and others. In 1854, in company with his brother, E. G. Bradbury, he began the manufacture of pianos, a business which proved extremely successful. He is best known as the composer and publisher of musical collections for schools and choirs, 59 separate works being credited to him, of which over 5,000,000 copies have been sold. The more important of his works are 'Young Choir' (1841); 'Flora's Festival' (1845); 'The Golden Chain' (1861); 'Pilgrim Song' (1863); 'The Golden Trio' (1864); 'The Shawm' (1864); 'The Jubilee' (1865); 'Temple Choir'; 'Fresh Laurels' (1867), his last work.

Bradbury, William Frothingham, American educator: b. Westminster, Mass., 17 May 1829, he was head master of the high school, Cambridge, 1881-86, and of the Cambridge Latin School from 1886. He has published a series of 24 mathematical text-books and has been secretary of the Boston Handel and Haydn Society from 1899.

Brad'dock, Edward, British general: b. Perthshire, Scotland, about 1695; d. Great Meadows, Pa., 13 July 1755. Through his

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father, an officer in the Coldstream Guards, who rose to be a lieutenant-colonel there and major-general of the line, he became in 1710 an ensign in that body, the haughty *élite* of British troops; which had the Duke of Cumberland, captain-general of the whole army, for one of its colonels, men of rank for subalterns, and its very privates chosen by other bodies for commissioned officers. Appointed captain in 1736, he rose to lieutenant-colonel by service on the Continent 1742-5, including Cumberland's battle of Fontenoy in 1745, where the Coldstreams covered themselves with glory; and in 1754 was made major-general of the line, thus paralleling his father. In that year an expedition to destroy the French power in America was resolved on; and on 24 September Braddock was made generalissimo of all the forces there, beyond question as being the officer known to Cumberland who was best able to accomplish the task. But his experience made him overrate formal discipline, and underrate (not only in action but in expert counsel) both foes and allies who lacked it; he could not fully realize new dangers nor appreciate methods of meeting them; he was hot of temper, rough of speech, overbearing in argument, obstinate in opinion; and these, with the martinetism natural enough in an officer of 60 after 43 years of the Coldstreams, and which were not vital in a drilled service, fatally alienated those in the new land on whom he had to depend for safety. Yet he was quick to recognize ability, and warm in acknowledging it; he regarded Washington and Franklin, the former but 22, as the greatest men in the colonies; and when the royal order of 1754 ranking all colonial commissions below all English ones prevented Washington from joining him, he sent a handsome letter asking the latter to be one of his military family, and voluntarily promised to use his influence in securing him a regular English commission. Landing at Hampton Roads, Va., 20 Feb. 1755, he attempted to collect men and stores for his expedition against Fort Duquesne (Pittsburg), but was baffled for many weeks by the sloth, rapacity, and unpatriotic local factions of the colonies, who did their best to justify the contempt with which he heartily if injudiciously visited them. The lack of men, supplies, transportation, and money delayed the expedition to its ruin. He tried to secure a large body of Indians for scouts and allies, but only obtained 40 or 50. He let all but eight of them go through bad judgment, and disgusted those so greatly by his manners that one of them deserted, and the rest warned their friends against coming near. The famous Indian hunter, Capt. Jack, wished to join him, but Braddock refused unless he would conform to military discipline, which the old scout would not do. Finally the expedition started from Fort Cumberland (now Cumberland, Md.) the first week in June, with 2,150 men. The march was most toilsome and slow, involving cutting roads, bridging streams, making causeways, passing through swamps, etc.; and on the 18th, at Little Meadows, 1,200 picked men were chosen to continue the expedition, the rest being left behind under Dunbar. On the night of 4 July he halted two days about 25 miles from his destination, to wait the reports of his Indian scouts and convoy of provisions from Dunbar's camp—to his destruction but not to his blame. Reaching Turtle (now Rush) Creek the road

suddenly ended at a precipice impassable for artillery and wagons, and he decided to quit the ridge, where ambushade was impossible, and make a double fording across an elbow of the Monongahela. Meantime the French commander, Contrecoeur, had decided to withdraw without a blow, but a Capt. Beaujeu asked leave to take a detachment and resist the passage of the second ford, eight miles off. He was given about 200 white troops, and by a brilliant appeal on the morning of the 9th to the Indians, who at first hung back, obtained several hundred of them also. When he came in sight of the English, they had already crossed, and advanced so that both flanks would be exposed for some 200 yards to an enemy who occupied the deep ravines, thick with tangled forest growth and vines, that seamed the river bluff. Braddock's ruinous error was in not beating up ahead on his flanks, as Col. Sir Peter Halket urgently besought him to do the night before; thereby he marched straight into the worst of ambushes. Into these the Indians glided, while the white troops barred the English path in front; and the head of the advancing column went down under a storm of lead. Shaken for a moment, the vanguard moved against the concentric ring; and after another terrible discharge, returned it with a volley that swept away every enemy in sight, and struck Beaujeu and a dozen others dead. The Indians turned to fly; rallied by the other French officers, they returned to cover, and under their unerring fire the English advance broke and retreated; mixing with the rear in the narrow path, both became mingled in a mob which Braddock could not restore to order. Huddled into a 12-foot road, shut in by a forest alive with yells and filled with an invisible foe, they lost all sense or perception, and twice shot down bodies of their own men who had gained slight vantage points, taking their smoke for the enemy's. Fifty Virginians were thus slain at a blow. The regulars refused to charge, though Braddock, with four horses successively shot under him, and the other officers strove to hearten them to invade the wood; the provincials sought to fight Indian fashion behind trees and logs, but Braddock with furious threats and blows drove them back into rank again, where they fell in scores. Washington and Halket begged to have them allowed to leave the ranks, but Braddock still refused. The ammunition began to fail; the baggage was attacked; all Braddock's aides but Washington were shot down; three fourths of the officers, and three fifths of the entire army; and only then would the ill-judging but heroic Braddock give the signal for retreat. Shortly afterward Braddock received a ball through the lungs; not one of the English soldiery would stay to carry him off the field, but one English and two American officers took him from the field to a spot half a mile across the river. Here the dying hero tried to establish a camp for a rallying place, and to care for the wounded and wait for Washington's return from Dunbar; but although the French and Indians had not followed them across, the 100 English soldiers he had induced to stop there stole away again and fled. The officers with their commander marched on till 10 p.m. on the 10th, when they halted and met the convoy from Dunbar, Braddock never ceasing to give calm, skilful, and humane orders; on the 11th he reached

Dunbar's camp, where the news of the rout had set his soldiers also deserting and fleeing in wild panic. Giving up all hope of the expedition in any hands now, he had the stores destroyed to keep them from the enemy, save enough for a flying march; and the remnant of the army proceeded toward Great Meadows, where Braddock expired, leaving his favorite horse and body servant to Washington. Of 1,460 men in the battle, 456 were killed and 421 wounded; 63 out of 89 commissioned officers were killed or injured, and every field officer. The enemy's casualties were about 60. The entire borders were left defenseless and desolated by a fearful Indian war.

Brad'don, Mary Elizabeth (Mrs. MAXWELL), English novelist: b. London, 1837, daughter of a solicitor there. She received her education at home, and early showed signs of literary power. After publishing some poems and tales, in 1862 she brought out 'Lady Audley's Secret,' which was almost instantly popular and the first of a long series of clever sensational novels, among which may be mentioned 'Aurora Floyd' (1862); 'John Marchmont's Legacy' (1863); 'Eleanor's Victory' (1863); 'Henry Dunbar' (1864); 'Dead Sea Fruit' (1869); 'Dead Men's Shoes'; 'Rupert Godwin' (1869); 'Hostages to Fortune' (1875); 'Ishmael' (1884); 'The Fatal Tree' (1888); 'The Venetians' (1892); 'Thou Art the Man' (1894); 'Sons of Fire' (1895); 'London Pride' (1896); 'Under Love's Rule' (1897); 'In High Places' (1898); 'Rough Justice' (1898); 'His Darling Son' (1899); 'The Infidel' (1900); 'The Conflict' (1903). She conducted the London magazine 'Belgravia' for some time, and some of her stories first appeared there. Her later works do not rely so much on sensational effects for their success as her earlier ones. In all she has published over 60 novels. She is the widow of John Maxwell, a well-known publisher.

Brad'ford, Alden, American historian and journalist: b. Duxbury, Mass., 19 Nov. 1765; d. Boston, 26 Oct. 1843. Originally a Congregational minister he became secretary of State of Massachusetts (1812-24), and editor of the *Boston Gazette* (1826). He wrote 'History of Massachusetts, 1764-1820'; 'History of the Federal Government'; 'Life of Jonathan Mayhew' (1838); 'New England Chronology' (1843).

Bradford, Amory Howe, American clergyman and author: b. Granby, Oswego County, N. Y., 14 April 1846. He was graduated at Hamilton College 1867, Andover Theological Seminary 1870; studied at Oxford University, England, and became pastor of the First Congregational Church, Montclair, N. J., in the year last named. He has written: 'Spirit and Life' (1888); 'Old Wine, New Bottles' (1892); 'The Pilgrim in Old England' (1893); 'Heredity and Christian Problems' (1895); 'The Growing Revelation' (1897); 'Art of Living Alone' (1899); 'The Return to Christ' (1900); 'Age of Faith' (1900); 'Spiritual Lessons From the Brownings' (1900); 'Ascent of the Soul' (1902).

Bradford, Andrew, American printer, son of William Bradford (1663-1752) (q.v.): b. Philadelphia about 1686; d. 23 Nov. 1742. He was the only printer in Pennsylvania from 1712 to 1723. He published the first newspaper in Philadelphia, 22 Dec. 1719, called the *American*

Weekly Mercury. It was by him that Benjamin Franklin was first employed, on his arrival in Philadelphia in 1723. In 1732 he was postmaster; in 1735 he kept a book store at the sign of the Bible in Second Street. In 1738 he removed to No. 8 South Front Street, to a house which in 1810 was occupied as a printing house by his descendant, Thomas Bradford, publisher of the 'True American.'

Bradford, Gamaliel, American writer and politician: b. Boston, Mass., 15 Jan. 1831. He has been prominent in politics as an independent, being a strong opponent of the Philippine policy of the administration, and is the author of 'Lesson of Popular Government' (1898); 'Types of American Character.'

Bradford, John, Protestant martyr and theologian: b. Manchester about 1510; d. Smithfield, London, 1 July 1555. He obtained a situation in the commissariat, and having been guilty of some defalcation, known only to himself, was so impressed by a sermon of Latimer on restitution, that he determined not only to sell everything he had in order to make up the defalcation, but to renounce an employment which exposed him to dangerous temptations. He afterward studied at Cambridge, where he received the degree of M.A., and on taking orders was appointed chaplain to the Bishop of London, and Canon of St. Paul's. From this time he devoted himself to the duties of his office with so much zeal and success that he became one of the most popular preachers of his day. In 1552 he was appointed chaplain to Edward VI., but under the reign of Queen Mary became a marked man. On the charge of preaching sedition he was committed to the Tower (occupying the same room with Ridley, Cranmer, and Latimer), and being brought to trial, was condemned to death as an obstinate heretic. His life is said to have been offered to him if he would only promise to refrain from preaching, but even this he had the manliness to refuse, and he was burned at the stake. A complete edition of his works, which include sermons, meditations, various treatises, etc., was published 1848-53.

Bradford, Joseph, American journalist and dramatic author: b. near Nashville, Tenn., 24 Oct. 1843; d. Boston, Mass., 13 April 1886. His real name was WILLIAM RANDOLPH HUNTER. Besides satirical verses he wrote a number of poems which were highly esteemed, especially those on the death of Victor Hugo and of Gen. Grant. His plays, 'Our Bachelors,' and 'One of the Finest,' were very successful and are still popular.

Bradford, Royal Bird, American naval officer: b. Turner, Me., 22 July 1844. He was graduated at the United States Naval Academy in 1865 and received promotion through various grades to the rank of commander. He has made a specialty of equipment, and since 1897 has been chief of the Bureau of Equipment at the Navy Department in Washington.

Bradford, William, American colonial governor and author: b. Austerfield, Yorkshire, England, 1590; d. Plymouth, 9 May 1657. He was one of the signers of the celebrated compact on the Mayflower; and, in 1621, on the death of the first governor, John Carver, was elected to the same office, which he continued to fill (with the exception of a brief

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period when he declined re-election) until his death. His administration was remarkably efficient and successful, especially in dealing with the Indians. One of his first acts was to adopt measures to confirm the league with the Indian sachem Massasoit. In the beginning of 1622, when the colony was subjected to a distressing famine, a threatening message was received from the sachem of Narragansett in the form of a bundle of arrows bound with the skin of a serpent. The governor sent back the skin filled with powder and ball. This decisive reply finished the correspondence. The Narragansetts were so terrified, that they returned the skin without even inspecting its contents. In return for his kindness and attentions to Massasoit in a dangerous illness, the sachem disclosed to the colony a dangerous conspiracy among the Indians, and it was suppressed. His 'Diary of Occurrences,' covering the first year of the colony, was published in 1622. He left a number of religious compositions in verse; and historical prose writings of great value, the most important being his 'History of the Plymouth Plantation' from the formation of the society in England, in 1602, down to 1647. This disappeared during the American Revolution, but was found in the library of Fulham Palace, England in 1858, and in 1808 was returned to the United States and placed among the archives of Massachusetts. The shorter writings of Bradford will be found in Young's 'Chronicles of the Pilgrims' (1841). See Cotton Mather, 'Magnolia' for life of Bradford; also Tyler, 'History of American Literature' (1808); Walker, 'Ten New England Leaders' (1901).

Bradford, William, the first printer in Pennsylvania: b. Leicester, England, 20 May 1603; d. New York, 23 May 1752. Being a Quaker, he emigrated in 1682 or 1683, and landed where Philadelphia was afterward built, before a house was begun. In 1687 he printed an almanac. The writings of George Keith, which he printed, having caused a quarrel among the Quakers, he was arrested in 1692 and imprisoned for libel. On his trial, when the justice charged the jury to find only the fact as to the printing, Bradford maintained that they were to find also whether the paper was really seditious, and that "the jury are judges in law as well as the matter of fact." He was not convicted, but having incurred the displeasure of the dominant party in Philadelphia, he removed to New York in 1693. In that year he printed the laws of the colony. On 16 Oct. 1725, he began the first newspaper in New York, called the *New York Gazette*. In 1728 he established a paper mill at Elizabethtown, N. J. Being temperate and active, he reached a great age without sickness, and walked about on the very day of his death. For more than 50 years he was printer to the government of New York, and for 30 years the only one in the province.

Bradford, William, American jurist, attorney-general of the United States: b. Philadelphia, 14 Sept. 1755; d. 23 Aug. 1795. He was graduated at Princeton College in 1772, and commenced the study of the law. In the spring of 1776, upon the breaking out of the war with Great Britain, he joined the militia, in which he attained the rank of lieutenant-colonel. In consequence of ill-health he was obliged to

resign at the end of two years, and was admitted to the bar in Philadelphia in 1779. In 1780 he was appointed attorney-general of Pennsylvania. Under the new Constitution he was appointed a judge of the supreme court 22 Aug. 1791. Upon the promotion of Edmund Randolph to the office of secretary of state he received from Washington the appointment of attorney-general of the United States 28 Jan. 1794. In early life he wrote some pastoral poems in imitation of Shenstone; but his principal production was an 'Inquiry how far the Punishment of Death is necessary in Pennsylvania.'

Bradford, William, American painter: b. New Bedford, Mass., 1827; d. New York, 25 April 1892. He entered business early in life, but abandoned it for art. His subjects were the ice fields of the North Atlantic, and well known works of his include 'Steamer Panther in Melville Bay under the Light of the Midnight Sun'; 'Crushed by Icebergs'; 'Arctic Wreckers'; 'Land of the Midnight Sun'; and 'Sunset in the North.'

Bradford, English manufacturing city, in the West Riding of Yorkshire, eight miles west of Leeds. It is pleasantly situated on a feeder of the Aire, at the junction of three extensive valleys, and consists of an ancient and a more modern portion, the latter with spacious, well-built streets. The appearance of the town has been almost completely changed since 1861, the corporation having, at a great expenditure of money, effected most extensive street improvements, widening the principal thoroughfares, improving the gradients, and opening up new streets. Spacious covered markets have been erected at a great cost. Among the public buildings are the town-hall (1873), in French Gothic style; St. George's Hall, erected in 1851, and capable of accommodating about 5,000 persons; an exchange, containing a statue of Cobden; a temperance hall; a mechanics' hall, with lecture rooms and library; a technical college, opened in 1882; free library (1872). The schools include the free grammar-school, endowed by Charles II., the girls' grammar-school, and the board schools. In Airedale College young men are trained for the ministry among the Independents. Among the charitable institutions may be noticed the infirmary, the eye and ear hospital, the children's hospital, St. Catharine's Home, an institution for the blind, and alms-houses. There is a fever hospital, to which patients are admitted at moderate charges, and when persons are too poor to pay, the corporation bears the cost. There is also a small-pox hospital. Bradford has several public parks, some of them finely laid out, besides Baildon Moor (600 acres) reserved for recreation purposes. There is an extensive system of water-works by gravitation, and water, gas, and electric supply undertakings are owned by the municipality. The worsted yarn and stuff trade is the principal industry; there are also alpaca and mohair manufactures (with which Sir Titus Salt's name is connected), manufactures of silk and velvet (the Manningham Mills of Lister & Company), mixed cotton and silk goods; and some cotton factories. In the neighborhood are quarries and iron-works. The town was incorporated in 1847, and its affairs are managed by a mayor, 21 aldermen, and 63 councillors. It was accorded the rank of a city in

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1897. The three parliamentary divisions of Central, East, and West Bradford each send one member to Parliament. A United States consulate is established here. Pop. (1901) 279,809.

Bradford, Pa., a city in McKean County, on several railroads; 15 miles northwest of Smethport, the county-seat. It is in an extensive coal, oil, and natural gas region, and is principally engaged in industries connected therewith, besides having machinery, chemical, boiler, and brick and tile works. The city has electric street railroads, daily and weekly newspapers, three national banks, large hospital, several libraries, and is lighted and heated by natural gas. Pop. (1900) 15,029.

Bradford-on-Avon, an ancient market-town of England, in Wiltshire, beautifully situated 28 miles northwest of Salisbury, on both banks of the Lower Avon, here crossed by two bridges—a very old one of nine arches in the centre of the town, and a modern one, Barton Bridge, of four. The town chiefly consists of three regular streets, containing many handsome houses. There is a good parish church of the Holy Trinity, in the Norman and subsequent styles; a town-hall, in Elizabethan style; and some interesting old buildings. Among the latter is the small but unique church of St. Laurence, the only complete specimen of Anglo-Saxon architecture still existing, and of great archaeological interest. It was built in the 8th century by Saint Aldhelm, and consists of a chancel, a nave, and a porch on the north side. Woolen cloth is manufactured, but this industry has declined. Bradford was of some note in Anglo-Saxon times, St. Dunstan having been elected Bishop of Worcester at a synod held in it. Pop. (1901) 4,514. See Perkins, 'Abbey Churches of Bath, Malmesbury, and St. Laurence' (1901).

Bradlaugh, Charles, English secularist: b. London, 28 Sept. 1833; d. 30 Jan. 1891. He made himself known by his writings and lectures, and more especially by his efforts to gain admission to Parliament. Being elected for Northampton in 1880, he claimed the right to make affirmation simply, instead of taking the oath which members of Parliament take before they can sit and vote, but being a professed atheist this right was denied him. Though repeatedly re-elected by the same constituency, the majority of the House of Commons continued to declare him disqualified for taking the oath or affirming; and it was only after the election of a new Parliament in 1885 that he was allowed to take his seat without opposition as a representative of Northampton. He was editor of the 'National Reformer.' Not long before his death Parliament erased from its records its resolution prohibiting him from taking the oaths. See the 'Life' (1894) by his daughter and J. M. Robertson.

Bradlee, Nathaniel, American architect: b. Boston, 1829; d. 1888; began the study of architecture in 1846. He achieved marked success, having been the architect of over 500 prominent buildings in the city of Boston. In 1869 he made a national reputation by moving bodily the large brick structure known as the Hotel Pelham to the corner of Tremont and Boylston streets. The work attracted wide attention,

both in this country and in Europe. He subsequently superintended the removal of the Boylston Market.

Bradley, Arthur Granville, English author, son of George Granville Bradley (q.v.): b. 11 Nov. 1850. He was educated at Marlborough and Trinity College, Cambridge, and has published 'History of Marlborough College' (1893); 'Life of Wolfe' (1895); 'Sketches from Old Virginia' (1897); 'Highways and Byways of North Wales' (1898); 'The Fight with France for North America' (1900); 'Highways and Byways of the English Lake District' (1901); 'Owen Glyndwyr' (1901).

Bradley, Edward (CUTHBERT BEDE), English author and clergyman: b. Kidderminster, 1827; d. Lenton, 12 Dec. 1889. He was graduated at Durham University, and was rector of Denton, Streton, and finally Lenton from 1883 until his death. He contributed to 'Punch' and other London periodicals, and published the 'Adventures of Mr. Verdant Green, an Oxford Freshman' (London 1855), a humorous picture of college life. His other works include 'Mr. Verdant Green Married and Done For' (1856); 'The White Wife,' a collection of Scottish legends (1864); 'Little Mr. Bouncer and His Friend, Verdant Green' (1873-4); and several books of travels.

Bradley, George Granville, English clergyman, dean of Westminster Abbey, 1881-1902: b. 11 Dec. 1821; d. London, 12 March 1903. He was educated at Rugby and University College, Oxford, and took orders in the Anglican Church. He was assistant master at Rugby 1846-58; master of Marlborough College 1858-70; master of University College 1870-81. In the last named year he became canon of Worcester and succeeded Dean Stanley as dean of Westminster. He published 'Recollections of Arthur Penryhn Stanley' (1883); 'Lectures on the Book of Job' (1884); 'Lectures on Ecclesiastes' (1885). He resigned the deanery of Westminster a few months before his death.

Bradley, Henry, English scholar and lexicographer: b. Manchester, England, 3 Dec. 1845. He has twice been president of the Philological Society and has been joint editor of the 'Oxford English Dictionary' from 1889. He has published 'The Story of the Goths' (1888); contributed important articles to the 'Dictionary of National Biography'; etc., and edited the E, F, G, and L portions of the 'Oxford Dictionary'.

Bradley, James, English astronomer: b. Sherborne, Gloucestershire, 1693; d. Chalford, Gloucestershire, 13 July 1762. He was educated at Balliol College, Oxford, and took orders, but his taste for astronomy soon led him in a different direction, and in 1721 he was appointed Savilian professor of astronomy at Oxford. Seven years afterward he made known his discovery of the aberration of light. But although this discovery gave a greater degree of accuracy to astronomical observations, yet slight differences remained which he studied during 20 years with the greatest perseverance, and finally discovered that they were fully explained by the supposition of an oscillating motion of the earth's axis, completed during a revolution of the moon's nodes, that is, in about 18 and a half years. He called this phenomenon the "nutations"

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of the earth's axis"; and published his account of it in 1748. By these two discoveries astronomers were, for the first time, enabled to make tables of the motions of the heavenly bodies with the necessary accuracy. Bradley had already, in 1726, explained the method of obtaining the longitude by means of the eclipse of Jupiter's first satellite. In 1742, at the death of Dr. Halley, he received the office of astronomer royal, and removed to the observatory at Greenwich. Here he spent the remainder of his life, entirely devoted to his astronomical studies. His observations in manuscript appeared under the title of 'Astronomical Observations made at the Observatory at Greenwich, 1750-62' (1798, 1805). From this rich mine have been taken thousands of observations, on the sun, moon, and planets, of the highest astronomical value.

Bradley, John Edwin, American educator: b. Lee, Mass. He was graduated from Williams College in 1865, and was successively principal of high schools in Pittsfield, Mass., 1865-8; Albany, N. Y., 1868-86. He was superintendent of schools at Minneapolis 1886-92, and president of Illinois College 1892-1900. He is the author of 'Science and Industry'; 'School Incentives'; 'Healthfulness of Intellectual Pursuits'; 'Work and Play'; 'Talks With Students.'

Bradley, Joseph Philo, American jurist: b. Berne, N. Y., 14 March 1813; d. Washington, D. C., 22 Jan. 1892. He was graduated at Rutgers College in 1836; admitted to the bar in 1839; and became a justice of the United States supreme court in 1870. As a member of the electoral commission he cast the vote which gave the presidency to Gen. Hays, in 1877. He devoted much time to mathematical study.

Bradley, Milton, American manufacturer: b. Vienna, Me., 8 Nov. 1836. He organized the Milton Bradley Company at Springfield, Mass., in 1863, for the manufacture of kindergarten supplies. He has published 'Color in the School Room' (1890); 'Color in the Kindergarten' (1893); 'Elementary Color' (1895); 'Water Colors in the School Room' (1900).

Bradshaw, John, English judge and regicide: b. Cheshire, England, 1602; d. London, 31 Oct. 1659. He studied law at Gray's Inn, and obtained much chamber practice from the partisans of the Parliament, to which he was zealously devoted. When the trial of the king was determined upon, the resolute character of Bradshaw pointed him out for president, which office, after a slight hesitation, he accepted. His deportment on the trial some describe as lofty and unbending, others as harsh and overbearing. He was subsequently appointed permanent president of the council of state, and received other honors. He rendered himself obnoxious to Cromwell, when the latter seized the protectorate, and was deprived of the chief-justiceship of Chester. On the death of Cromwell in 1658, and the restoration of the Long Parliament, he obtained a seat in the council, and was elected president. He died in 1659, and on his death-bed asserted that, if the king were to be tried and condemned again, he would be the first to agree to it. He was magnificently buried in Westminster Abbey, from which his body was ejected and hanged on a gibbet at Tyburn, with those of Cromwell and Ireton, at the Restoration.

Bradshaw's Railway Guide, a well-known English manual for travelers, first issued by George Bradshaw, a printer and engraver of Manchester, in 1839. It is now published on the first of each month, and contains the latest arrangements of railway and steamboat companies, beside other useful information. There are now many such hand-books in the field, and the idea has since been further developed in the descriptive hand-books of Murray, Bædeker, and others.

Bradstreet, Anne, American poet: b. Northampton (probably), England, 1612; d. Andover, Mass., 16 Sept. 1672. She was the daughter of Gov. Thomas Dudley, and married the future governor, Simon Bradstreet, in 1628. She went with him to New England in 1630. She was the first woman of letters in America, her verse being written in the intervals of household cares, and by her contemporaries was styled "The Tenth Muse." Her volume of poems was published in London in 1650. A more complete edition appeared at Boston in 1678, containing, among other additional compositions, her best poem, entitled 'Contemplations.' A third edition was published in 1758. She was the mother of eight children, to whom she makes the following allusion:

I had eight birds hatch't in the nest;
Four cocks there were, and hens the rest;
I nurs't them up with pains and care,
For cost nor labor did I spare;
Till at last they felt their wing,
Mounted the trees and learned to sing.

Her complete works, edited by J. H. Ellis, were reprinted in Boston in 1867, and again in 1897. See Tyler, 'American Literature' (1898).

Bradstreet, John, English soldier in America: b. 1711; d. New York, 21 Oct. 1774. He was, in 1746, lieutenant-governor of St. Johns, Newfoundland. In 1756, when it was considered highly important to keep open the communication with Fort Oswego, on Lake Ontario, he was placed at the head of 40 companies of boatmen, raised for the purpose of supplying it with stores from Schenectady. On his return, 3 July 1756, with 300 of his force he was attacked from an ambuscade, on the Onondaga River, but repulsed and routed the enemy with great loss. In 1758 he commanded a force of 3,000 men in the expedition against Fort Frontenac, which was surrendered 27 August, with all its military stores, provisions, and merchandise, on the second day after he commenced the attack. In 1764 he advanced with a considerable party toward the Indian country, and made a treaty of peace with the various tribes at Presque Isle. He was appointed major-general in 1772.

Bradstreet, Simon, American colonial governor: b. Horbling, Lincolnshire, England, March 1603; d. Salem, Mass., 27 March 1697. Left an orphan at the age of 14, he was brought up under the care of Thomas Dudley (q.v.), whose daughter Anne he married. For a time he was steward to the Earl of Lincoln, and later to the Countess of Warwick. He, with Dudley and Winthrop, determined to emigrate and form a settlement in Massachusetts. Embarking with his wife on the Arbella, 20 March 1630, they anchored off Salem on 12 June. In 1631 Bradstreet was one of those who

commenced building at Newtown, now Cambridge, and he resided there for several years. In 1639 he was granted 500 acres of land at Salem. He was also one of the first settlers of Andover, building in 1644 the first mill on the Cochichewick. After the death of his wife in 1672, he seems to have spent his time mainly in Boston and Salem. He was the colony's first secretary, one of the first commissioners of the United Colonies in 1643, and in 1653 vigorously opposed making war on the Dutch in New York, and on the Indians; and it was prevented by his steady and conscientious opposition and the decision of the general court of Massachusetts. He was deputy-governor from 1672 until his election as governor in 1679, in which office he continued until 1686. When Charles II. demanded the colony's charter, Bradstreet thought it better that it should be surrendered than that it should be taken away by judgment. He opposed the arbitrary proceedings of Andros, and when, in 1689, the people put down his authority, they made their former governor their president, and he continued as the head of the administration till May 1692, when Gov. William Phipps arrived, bringing the new charter, in which Bradstreet was named as first assistant. For 62 years he had been in the service of the colony, and he lived to be the "Nestor of New England," for all who came over from England with him, died before him. He was a popular magistrate and official, a man of integrity and piety, and one of the few who stoutly opposed the witchcraft delusion of 1602. See *New England Historical and Genealogical Register*, Vol. I., pp. 75-6, and Vol. VIII., p. 325, for a reprint of his 'Journal, 1664-83.'

Bradwardine, brād'wér-dīn, or **Bredwardine**, Thomas (DOCTOR PROFUNDUS), English scholar: b. Hartfield, Sussex, about 1290; d. 1349. He was distinguished for his varied learning, and more particularly for his treatise, 'De Causa Dei Contra Pelagium,' an extensive work against the Pelagian heresy, for centuries a standard authority. He was chaplain and confessor to Edward III., whom he accompanied to France, being present at Cressy and the capture of Calais. Being appointed archbishop of Canterbury, he hastened to England, but died of the black death on reaching London. Other works by him are: 'De Geometria Speculativa'; 'De Proportionibus'; 'De Quadratura Circuli'; 'De Arithmetica Practica.'

Bradwardine, Baron, a character in Scott's novel of 'Waverley.' He is represented as a rather opinionated retired soldier, living at his seat of Tully Vedlan.

Brady, Anthony Nicholas, American capitalist: b. of Irish parentage, Lille, France, 22 Aug. 1843. He came as an infant with his parents to the United States, and at the age of 13 began to make his own way in life. After engaging successfully in the tea business in Albany, and in that of granite quarrying, he became financially interested in gas companies, railway companies and the like, successfully developing the street railway system of New York and amassing a fortune of many millions. He has also been connected with oil and electric lighting interests.

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Brady, Cyrus Townsend, American Episcopal clergyman and author: b. Allegheny, Pa., 20 Dec. 1861. He graduated from the United States Naval Academy, 1883, but resigned, studied theology under Bishop Worthington of Nebraska, and was ordained in 1890. For five years he served as a missionary in Colorado, Missouri, and Kansas; was archdeacon of Pennsylvania, 1895-9, and rector at Overbrook, Philadelphia, from 1899 until his resignation to devote himself exclusively to writing, in which he has attained popularity as a writer of stories and novels of adventure, romance, and history. He has written: 'For Love of Country' (1898); 'For the Freedom of the Sea' (1899); 'Stephen Decatur' (1900); 'Recollections of a Missionary in the Great West' (1900); 'American Fights and Fighters' (1900); 'Commodore Paul Jones' (1900); 'When Blades are Out and Love's Afeld' (1901); 'Under Tops'ls and Tents' (1901); 'An Apostle of the Plains' (1901); 'Colonial Fights and Fighters' (1901); 'Under the Ban of the Red Beard' (1901); 'Border Fights and Fighters' (1902); 'Hohenzollern' (1902); 'In the Wasp's Nest' (1902); 'Quiberon Touch' (1901-2); 'Woven With the Ship' (1902); 'The Bishop' (1903); 'Conquest of the Southwest' (1903); 'The Southerners' (1903).

Brady, Henry Bowman, English paleontologist: b. Gateshead, England, 1835; d. 1890. He was prominent as a manufacturing pharmacist and his success in business enabled him to devote much time to scientific research, becoming in time the highest English authority regarding foraminifera. He was the author of several monographs on Mesozoic, Cenozoic, and other foraminifera, and of the more important works: 'Report on the Foraminifera Dredged by H. M. S. Challenger, During the Years 1873-6,' and 'Scientific Results of the Challenger Voyage,' Vol. IX. (1888).

Brady, Hugh, American general: b. Northumberland County, Pa., 1768; d. Detroit, 15 April 1851. He entered the United States army as an ensign, 7 March 1792; served with Wayne in his western expedition, after the defeat of St. Clair; was made lieutenant in 1794, and captain in 1799. Having left the military service, he was restored to it in 1808, by President Jefferson, who then began to reform the army. 6 June 1812 he was appointed colonel of the 22d foot, and led his troops in the hard-fought battle of Chippewa. They were almost annihilated, but displayed the greatest courage, Gen. Scott saying in his report, "Old Brady showed himself in a sheet of fire." He displayed equal courage at the battle of Niagara Falls, where he was wounded. He was retained in service, on the reduction of the army, as colonel of the 2d foot, a commission he held until his death. After 1835 he was in command of the department of which Detroit was the headquarters; and while at that place contributed, in no small degree, to the pacification of the frontier, during the Canadian troubles. He was looked on by the army as one of its fathers. He received two brevets, as brigadier-general, 6 July 1822, and as major-general, for long and faithful service, 30 May 1848. Immediately before his death, the chaplain of his corps visited him and sought to speak to him of religious matters. Gen. Brady listened to him,

and said, "Sir, that is all right; my knapsack, however, has been packed, and I am ready to march at the tuck of the drum."

Brady, James Topham, American lawyer: b. New York, 9 April 1815; d. there, 9 Feb. 1869. He was educated by his father, an eminent jurist, and admitted to the bar in 1836. His eloquence, skill, and ability at once brought him reputation and a fine practice. Conspicuous for his knowledge in all departments of law, he won verdicts from judges and jurors alike in important patent cases, such as *Goodyear v. Day*; cases involving questions of medical jurisprudence, like the *Allaire and Parish* will cases, the *Huntington* forgery case, and *Cole* homicide case; divorce cases, like that of *Mrs. Edwin Forrest*, and civil actions of all kinds. He was at his best in criminal cases, where he usually appeared on the side of the defense. At one time he defended successfully in a single week four clients charged with murder. In 1859 he was counsel for Daniel E. Sickles in his trial for the assassination of Philip Barton Key, his opening address for the defense being one of his most notable forensic efforts. Though a States-rights advocate before the War, he supported Lincoln's war measures, making speeches which had considerable influence.

Brady, John, Irish-American ecclesiastic: b. County Cavan, Ireland, 1842. He prepared for the priesthood at All Hallows College in Ireland, was assistant priest in Newburyport, Mass., 1864-8, and since 1868 has been pastor of St. Joseph's Church at Amesbury, Mass. In 1891 he was consecrated auxiliary bishop of Boston and titular bishop of Boston, but still continues his parochial work.

Brady, Nicolas, English prelate: b. Bandon, Ireland, 28 Oct. 1659; d. Richmond, Surrey, 20 May 1726. He was educated at Westminster School, and afterward received the degree of B.A. both at Oxford and at Dublin, and took orders in the Irish Church. Having come to England he obtained several ecclesiastical preferments; among others the rectory of the Church of St. Catharine Cree, London, and that of Richmond, Surrey. This put him in possession of an income which might, but does not seem to have sufficed for his wants, as he thought it necessary to increase it by keeping a school at Richmond. His largest work, a translation of the *Æneid*, was an absolute failure, but he has made his name a kind of household word, at least in England, by executing, in concert with Nahum Tate, the 'New Versions of the Psalms of David' (1695), which soon came to be commonly used in the Episcopal Church.

Brady, William Maziere, Irish theologian: b. Dublin, 1825. He was for a long period a clergyman in the Established Church of Ireland, but was prominent in the agitation leading to its disestablishment in 1869, and lost several of his preferments by that event. In 1873 he entered the Roman Catholic Church. He has published 'The Episcopal Succession in England, Ireland, and Scotland, 1400-1875' (1876-7); 'Annals of the Catholic Hierarchy in England and Scotland' (1883); 'Anglo-Roman Papers' (1890).

Brady-car'dia, an abnormally slow heart. Brady-cardia occasionally is a family trait, and is then normal. Napoleon is said to have had a heart beat of only 40 to the minute. It may occur during pregnancy, and is often present in the convalescence of fevers, particularly typhoid, acute rheumatism, diphtheria, and pneumonia. It sometimes accompanies disease of the digestive tract; is often present in emphysema, and further present rarely in a number of conditions. Among these may be mentioned fibroid changes in the heart, nephritis, lead, alcohol, tobacco, and digitalis poisoning, in melancholia, general paresis, and in apoplexy. It may mean much or may be insignificant, and its importance is largely measured by its causative factors.

Braeकेलेर, Ferdinandus dé, fér-de-nān'doos dé bra'kē-lār, Belgian artist: b. Antwerp, 1792; d. 1883. He was a member of the Antwerp Academy and a director of the Antwerp Museum, and as an instructor was especially successful. Among his works are 'Tobit Burying a Jew by Night' (1817); 'The Baker'; 'Bombardment of Antwerp in 1830'; 'Happy Family'; 'Unhappy Family.'

Braemar, brā-mār', Scotland, a mountainous district in the southwest corner of Aberdeenshire. It contains part of the Grampian range, with the heights of Ben Macdhui, Cairn-toul, Lochnagar, etc. The district has some fine scenery, valleys, and hillsides covered with birch and fir, but consists largely of deer-forests. The Balmoral Castle, formerly the residence of the late Queen Victoria, is situated here, on the banks of the Dee, midway between Ballater and Braemar village (Castleton of Braemar).

Brag, a game of cards, played with a full-pack. It is so named because each player endeavors to impose upon his neighbor, by "bragging" about his hand, in an endeavor to make his opponents believe it more valuable than it is. The cards rank as in whist, except the nines and knaves, which take their value from the cards with which they are held. Thus an ace, a nine, and a knave are equivalent to three aces. The hands are shown, not played, the strongest one taking the stakes.

Braga, Theophilo, Portuguese philologist and critic: b. San Miguel, Azores, 24 Feb. 1843. He was educated at the university of Coimbra, and became professor of literature in the *Curso Superior de Letras* in Lisbon. He is a very voluminous writer and takes important rank as a historian of the literature of the Iberian peninsula. He is also noted as an exponent of the Comtian philosophy. In politics he has been prominent as an active democrat. In addition to other literary activity, he has published several volumes of poems. Among these may be mentioned: 'Stella Matutina' (1863); 'Tempestades Sonoras' (1864); 'Torrentes' (1868), and a collection entitled 'Alma Portuguesa' (1893). Of his other works may be noted: 'Historia da Litteratura Portuguesa' (1870-81); 'Manual da Litteratura Portuguesa' (1875); 'Parnaso Portuguez Moderno' (1877); a volume on Camões (1880); 'Traços Geraes de Philosophia Positiva' (1877); 'Contos Tradicionaes do Povo Portuguez' (1883); 'Systema de Sociologia' (1884); 'Historia da Universidade de Coimbra' (1892).

Braga, brā'gā, Portugal, a town in the province of Minho, and its capital, situated on a rising ground between the Cavado and D'Este, about 32 miles north-northeast of Oporto. It is surrounded by walls flanked with towers and defended by a castle. The houses are old, the streets broad, but not well laid out. It is the seat of an archbishop who is primate of Portugal, and contains an archiepiscopal palace, a richly ornamented Gothic cathedral of the 13th century, parish churches, monasteries, a college, etc. The manufactures are of some importance. Braga is supposed to have been founded by the Carthaginians, and there exist remains of a Roman temple, amphitheatre, and aqueduct. On a hill some distance east of the town stands the famous pilgrimage church of Bom Jesus do Monte. Pop. (1890) 23,089.

Bragança, brā-gān'sā, the name of two considerable towns in Brazil: (1) A seaport, 100 miles northeast of Para, at the mouth of the Cate, which is here navigable to the town. Pop. of town and district, 6,000. (2) An inland city of about 10,000 inhabitants, 50 miles north-east of Sao Paulo.

Bragança, or **Braganza**, Portugal, the capital of a district (of the same name) in the province of Tras-os-Montes. It was in former times the capital of the province, and is a place of considerable importance. It has the ruins of an ancient castle, one of the finest feudal remains in Portugal. It is the see of a bishop, and there is an extensive manufactory of velveteens, printed calicoes, and woollens. Bragança has given its name to the present royal family of Portugal. Pop. about 5,500.

Bragança, or **Braganza**, House of, the present reigning house of Portugal, derived from Affonso, Duke of Bragança, a natural son of João I., king of Portugal. The constitution of Lamego, 1139, declares that no foreign prince can succeed to the throne; consequently in 1578, on the death of the Portuguese hero Sebastian, in Africa, without issue, his people had recourse to the illegitimate line of Bragança. Philip II. of Spain, however, claimed the throne, and supported his pretensions by an army under the Duke of Alva, who, though in disgrace, was summoned from his retreat for this express purpose. In 1668 the Portuguese shook off the Spanish yoke. In 1801 Napoleon I. declared that the line of the Bragança sovereigns had ceased. John, regent of the kingdom, withdrew to Brazil in 1807, but returned in 1821. At his death in 1826 his son, Don Pedro, resigned the throne in favor of his daughter, Maria da Gloria, preferring to remain emperor of Brazil, to which office he had been elected by the Brazilians, 18 Nov. 1825.

Bragg, **Braxton**, American military officer: b. Warren County, N. C., 22 March 1817; d. Galveston, Tex., 27 Sept. 1876. He graduated at West Point in 1837; was appointed second lieutenant in the 3d Artillery; served with distinction under Gen. Taylor in the Mexican war; and retired to private life in 1856. At the outbreak of the Civil War he became a brigadier-general in the Confederate army, and was stationed at Pensacola to act against Fort Pickens. In 1862, having been appointed a general of division, with orders to act under Gen. A. S. Johnston, commanding the army of the Mississippi, he took an important part in the two

days' battle of Shiloh. On Johnston's death he was appointed to his command, with the full rank of general, and succeeded Gen. Beauregard as commander of the department in July of the same year. The last command he resigned in December 1863. His chief success was at Chickamauga in September 1863, when he inflicted a defeat on the army of Gen. Rosecrans, but was himself, in turn, defeated by Gen. Grant, which led to his temporary removal from command in January 1864, and he was appointed military adviser to Jefferson Davis. In 1864 he assumed command of the department of North Carolina. After the war he was chief engineer of the State of Alabama, and superintendent of the improvements in Mobile Bay.

Bragg, **Edward Stuyvesant**, American legislator: b. Unadilla, N. Y., 20 Feb. 1827. He was educated at Geneva (now Hobart) College, and admitted to the bar in New York in 1848. He removed to Fond du Lac, Wis., and was admitted to the Wisconsin bar in 1850, to that of Illinois in 1869, and to that of the United States supreme court in 1877. He served in the Union army during the Civil War, and won his way to the rank of brigadier-general. He was a member of the Union convention at Philadelphia in 1866; representative in Congress in 1877-85; and a delegate to the Democratic National Conventions of 1872, 1884, 1892, and 1896. In the convention of 1884 he seconded the renomination of Grover Cleveland, when he uttered the memorable phrase, "We love him for the enemies he has made." In 1888 he was appointed minister to Mexico; and in June 1902, became the first United States consul-general in Havana under the new republic of Cuba.

Bragi, brā'jē, the Scandinavian god of poetry. He is represented as an old man with a long flowing beard, like Odin; yet with a serene and unwrinkled brow. His wife was Idunna.

Braham, brā'am, **John**, English tenor singer: b. London (of Jewish extraction), 1774; d. 1856. He made his first appearance as a vocalist at the age of 10. On attaining manhood he proceeded to France and Italy with the view of improving himself in his art, and accomplished this so successfully that on his return after an absence of several years he soon rose to the position of the first English singer of his day. He sung much in opera, but gained his greatest triumphs in national songs, such as 'The Bay of Biscay, O', and 'The Death of Nelson,' and till within a few years of his death he continued to appear in public. His sons, Charles, Augustus, and Hamilton, also adopted the musical profession.

Brahé, **Tycho**, tí'kō brā, or brā, Swedish astronomer: b. Knudstrup, near Lund, 14 Dec. 1546; d. Prague, Bohemia, 24 Oct. 1601. The district where he was born was then a province of Denmark, but the family was of Swedish origin. He was sent at the age of 13 to the University of Copenhagen with the intention that he should be educated for government service. He evinced great promise as a Latin scholar, but an eclipse of the sun turned his attention to astronomy. His uncle sent him later to Leipsic to study law, but Brahé, while his tutor slept, busied himself nightly with the stars. He succeeded, as early as 1563, in detecting grave errors in the Alphonsine tables and

the so-called Prutenic (that is, Prussian) tables, and set about their correction. The death of an uncle, who left him an estate, recalled him to his native place in 1565; but he very soon became disgusted with the ignorance and arrogance of those moving in the same sphere with himself, and went back to Germany. At Wittenberg, where he resided for a short time, he lost part of his nose in a duel with a Danish gentleman; but for the lost organ he ingeniously contrived one of gold, silver, and wax, which fitted admirably. After two years spent in Augsburg, he returned home, where, in 1572, he discovered a new and brilliant star in the constellation Cassiopeia. In 1573 he married a peasant girl. After some time spent in travel, Brahé received from his sovereign, Frederic II., the offer of the small island of Hven or Hoene, in the sound, 10 miles from Copenhagen, as the site for an observatory, the king also offering to defray the cost of erection, and of the necessary astronomical instruments, as well as to provide him with a suitable salary. Brahé accepted the proposal, and, in 1576, the castle of Uranienburg ("fortress of the heavens") was begun. Here, for a period of 20 years, Brahé prosecuted his observations with the most unwearied industry. Here, also, he was visited by astronomers, mathematicians, philosophers, theologians and princes, among the latter being the future James I. of England, who took a lively interest in the astronomer's work. Asking Brahé what gift he should make in return for the other's courtesy, the scholar replied, "Some of your majesty's own verses." So long as his munificent patron, Frederic II., lived, Brahé's position was all that he could have desired, but on his death in 1588 it was greatly changed. Under Christian IV. Brahé was barely tolerated; but in 1597 his situation had grown so unbearable that he left the country altogether, having been the year before deprived of his observatory and emoluments. After residing a short time at Rostock and at Wandsbeck, near Hamburg, he accepted an invitation of the Emperor Rudolf II.—who conferred on him a pension of 3,000 ducats—to Benatek, a few miles from Prague, where a new Uranienburg was to have been erected for him, but he died shortly after. On his deathbed he solemnly confided his system to his celebrated pupil Kepler, then but 28 years old.

Brahilow, Brailow, brä'e-low, or Braila, brä'e-la, Rumania, a town and port on the left bank of the Danube, about 12 miles above Galatz, and over 120 miles from the Sulina mouth of the river. It is accessible by large sea-going vessels, and carries on a great trade in the export of grain, importing coal, agricultural machinery, etc. Both as regards accommodation for shipping and otherwise it has been much improved in recent years. In the Turkish wars of the latter half of the 18th century Brahilow was several times besieged and taken by the Russians. In 1828 it had to surrender to the Russians after a gallant resistance, but in 1829 the Peace of Adrianople restored it to the Turks. Pop. (1894) 51,116.

Brahma, the first person in the Triad, or Trimurti, of the Hindus, which consists of Brahma the creator; Vishnu the preserver or redeemer; and Siva the destroyer. He is represented with four heads and as many arms,

holding in his four hands a manuscript book containing a portion of the Vedas, a pot for holding water, a rosary, and a sacrificial spoon. The swan is consecrated to him and in the cave temple of Elephanta he is represented as sitting on a lotus, supported by five swans. He is the god of the fates, master of life and death, and, by some, has been represented as the supreme eternal power; but he is himself created and is merely the agent of Brahmā (a neuter noun), the universal power or ground of all existence. He is considered as the author of the Vedas and the lawgiver and teacher of India. The worship of Brahma is regarded as the oldest religious observance in that country. In modern Hindu religion, however, it has been practically superseded by the worship of Vishnu and Siva. The epithets applied to this divinity are very numerous, some of the most usual being Swayambhu, the self-existing; Parameshti, who abides in the most exalted place; Pitamaha, the great father; Prajâpati, the lord of creatures; Lokesa, the ruler of the world. See INDIA; BRAHMANAS.

Brahmagupta, Hindu astronomer and mathematician: b. probably toward the close of the 6th century A.D. His 'Brahma-sphuta-siddhanta' (the Improved System of Brahma) is said to be an earlier work recast: portions of it have been translated into English.

Brahman Bull, a bull of the humped cattle, or zebu breed, of India and eastward, regarded with veneration by devout Hindus, and safe from molestation, even when turned loose by temple priests to forage upon the market stalls in city streets. Adorned with trappings and garlands of flowers, these pampered bulls figure largely in religious ceremonials and processions. See also INDIAN HUMPED CATTLE.

Brahmanas, the ancient theological writings appended to the original four Vedas by the Brahmans, or priests, for the purpose of very greatly magnifying their own office as a caste intrusted with the conduct of sacrifices of every kind. There are some 13 of them, with attachments to different parts of the original four Vedas. The Satapatha-Brahmana is the most important and valuable. It is called Satapatha, or "of the hundred paths," because it consists of 100 lectures. It has a very minute and full account of sacrificial ceremonies in Vedic times, and many legends and historical allusions. Nothing could be more wearisome reading; yet the information which can be gleaned in regard to sacrifices, the priestly caste, and many features of the social and mental development of India, is very valuable. A devout belief in the efficacy of invocation and sacrifice appears in the Vedic hymns. This was taken advantage of by the Brahmans to arrange a regular use of these hymns in the two liturgical Vedas, and to establish a proper offering of sacrifices conducted by themselves. The Brahmanas are their endlessly repeated explanations and dictions about sacrifice and prayer.

The third, four, and fifth books of the great work presented in these five volumes deal very particularly with the Soma-sacrifice, the most sacred of all the Vedic sacrificial rites. It concerns the nature and use of "a spirituous liquor extracted from a certain plant, described as growing on the mountains." "The potent juice of the Soma plant, which endowed the

feeble mortal with godlike powers and for a time freed him from earthly cares and troubles, seemed a veritable God—bestower of health, long life, and even immortality." The moon was regarded as the celestial Soma, and source of the virtue of the plant. Another branch of the story of sacrifices relates to the worship of Agni, the Fire. It fills 5 out of 14 books, and the ideas reflected in it are very important for knowledge of Brahman theosophy and cosmogony. The ritual of the Fire-altar was brought into close connection with that of the Soma "fiery" liquor.

Brahmans, the first of the four castes of the Hindus. They proceeded from the mouth of Brahma, the seat of wisdom. They form the sacred or sacerdotal caste, whose members have maintained perhaps a more absolute and extensive authority than the priests of any other nation. Their great prerogative is that of being the sole depositaries and interpreters of the Vedas, or sacred books. There are seven subdivisions of the Brahmans, which derive their origin from seven penitents, personages of high antiquity and remarkable purity, who are said to have rebuked the gods themselves for their debaucheries. The great body of the Brahmans pay equal veneration to the three parts of the mysterious trinity, but some attach themselves more particularly to one person of the triple godhead. Thus the Vishnuvites are distinguished by an orange-colored dress, and the mark called *nama* on their foreheads. The devotees of Siva wear the *lingam*, and are distinguished from the former by their great abstemiousness. A Brahman should pass through four states. The first begins at about seven, when the duty of the young novice, or *Brahmachari*, consists in learning to read and write, studying the Vedas, and becoming familiar with the privileges of his caste, and all matters of personal purity. Thus he is taught his right to ask alms, to be exempted from taxes, from capital and even corporal punishment. Earthen vessels belonging to Brahmans, when used by profane persons, or for certain purposes, must be broken. Leather and skins of animals, and most animals themselves, are impure, and must not be touched by them. Flesh and eggs they are not allowed to eat. The Brahman is also taught to entertain a horror of the defilement of the soul by sin; and rules for purification by ablution, penances, and various ceremonies, are prescribed. The second state begins at his marriage, when he is called *Grihastha*. Marriage is necessary to his respectability. His daily duties become more numerous, and must be more strictly performed. Regular ablutions, fasting, and many minute observances, become requisite. The Brahmans, however, engage in secular employments, political, commercial, etc. The third state is that of the *Vana-Prasthas*, or inhabitants of the forest, which is now, however, seldom reached. They were honored by kings, and respected even by the gods. Retiring to the forest, green herbs, roots, and fruit were their food: reading the Vedas, bathing morning, noon, and evening, and the practice of the most rigorous penances were prescribed. "Let the *Vana-Prastha*," says Manu, in the Institutes, "slide backward and forward on the ground, or stand the whole day on tip-toe, or continue rising and sitting down alternately; in the hot season let him sit exposed to five fires; in the rain let

him stand uncovered; in the cold season let him wear wet garments; then, having stored up his holy fires in his mind, let him live without external fire, without a shelter, wholly silent, and feeding on roots and fruit. When he shall have thus become void of fear and sorrow, and shaken off his body, he rises to the divine essence." The fourth state is that of a *Sannyasi*, in which new and severer penances are to be performed. Suppressing the breath, standing on the head, and other such ceremonies are performed, till the devout patient rises to a participation of the divine nature. It was by the Brahmans that the Sanskrit literature was developed; and they were not only the priests, theologians, and philosophers, but also the poets, men of science, lawgivers, administrators, and statesmen of the Aryans of India. The sanctity and inviolability of a Brahman are maintained, in the eyes of his countrymen, by the most severe penalties. The murder of one of the order, robbing him, etc., are inexpiable sins; the killing of his cow can only be expiated by a painful penance. See Monier-Williams, 'Brahmanism and Hinduism' (1887); Barth, 'Religions of India'; Hopkins, 'Religions of India' (1895).

Brahmaputra, *brä'ma-pö'tra*, a large river of Asia, whose sources, not yet explored, are situated near Lake Manasarovara, in Tibet, near those of the Indus. In Tibet, where it is called the Sanpo, it flows eastward north of the Himalayas, and, after taking a sharp bend and passing through these mountains, it emerges in the northeast of Assam as the Dihong; a little farther on it is joined by the Dibong and the Lohit, when the united stream takes the name of Brahmaputra, literally "the son of Brahma." After entering Bengal it joins the Ganges at Goalanda, and farther on the Meghna, and their united waters flow into the Bay of Bengal. The Brahmaputra is navigable by steamers for about 800 miles from the sea, its total length being, perhaps, 1,800 miles. Through the last 60 miles of its course it is from 4 to 5 miles wide, and studded with islands. Its waters are thick and dirty; its banks are mostly covered with marshes and jungles, and are subject to annual inundations. During the season of the overflow, from the middle of June to the middle of September, the level districts of Assam are almost wholly submerged, so that travel is impossible, except on causeways 8 or 10 feet high. The volume of water discharged by the river at such times is immense. Even in the dry season it is equal to 146,188 cubic feet a second, while in the same time, and under the same circumstances, the Ganges discharges only about 80,000.

Brahmo-Somaj, a religious association of India, founded in 1830 by Rammohun Roy, a famous Hindu rajah, who sought to purify Brahmanism from impurities and idolatries, and first styled "The Society of God." The Brahma-Somaj, while accepting what religious truth the Vedas may contain, rejects the idea of their special infallibility, and founds its faith on principles of reason. The members do not in principle recognize the distinction of caste, and have made great efforts to weaken this as well as other prejudices among their countrymen. The foremost exponent of its views was the Babu Keshub Chunder Sen, who with his

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followers founded the "Brahmo-Somaj of India" in 1858. See Mozoondar, 'Life and Teachings of Keshub Chunder Sen' (1887).

Brahms, Johannes, German composer: b. Hamburg, 7 May 1833; d. Vienna, 3 April 1897. His father was a double-bass player in the Stadt-Theater of his native town, and from him he received his first instruction in musical technique; but his artistic taste was developed under the guidance of the eminent musician, Eduard Marsden of Altona. At the age of 14 years he made his first public appearance as a pianist at Hamburg, playing a set of variations composed by himself. In 1853 he traveled with the noted Hungarian violinist Remenyi on a concert tour of Germany as piano accompanist: this tour was critical for his whole career. In the program of the concert given at Göttingen was Beethoven's Kreutzer Sonata. The piano was a half tone below the true pitch, but Brahms straightway remedied the defect, playing the part from memory and transposing it from A to B flat—a feat which won the admiration of the celebrated violinist Joachim, who was in the audience; and who after the performance made himself known to the young musician; thus commenced a warm friendship which lasted during Joachim's life. He gave the young man commendatory letters to Liszt, then at Weimar, and to Schumann at Düsseldorf, and advised him to give up the concert tour. Brahms acted instantly on this counsel, visited Schumann and showed him some of his compositions, with the result that Schumann recognized in the young artist supreme musical genius, and in his enthusiastic admiration hailed him in an article entitled "Neue Bahnen," published in his 'Neue Zeitung für Musik' as already a master, the great composer of the future, and in the words of John the Baptist (Matt. xi. 3) as rendered in the Latin vulgate, as "he that is to come." Brahms, he declared, had not attained mastery by a gradual development, but had "burst upon us fully equipped as Minerva sprung from the head of Jupiter." Yet at this time the young maestro had produced but very few works—a string quartet, a scherzo in E flat, and a few songs, among them the dramatic 'Liebestreue.'

His eminent gifts were now generally recognized, and after giving a concert in Leipzig, two music publishers made an engagement with him to publish his compositions; and in 1854 he was appointed music master and choir conductor to the Prince of Lippe-Detmold. From 1858 to 1862 he resided first in Hamburg and then in Zürich, making musical tours and pursuing his musical studies. Going to Vienna in 1862 he was director of the Singakademie there in 1863, but after a few months resigned that office and quitted Vienna, to resume his concert tours throughout Germany. He took up his residence again in the Austrian capital in 1872, and thereafter till his death Vienna was his home, though for some years he made musical tours occasionally; but toward the close of his life he devoted himself almost exclusively to the work of musical composition. In 1877 the English University of Cambridge apprised him of its senate's intention to honor him with the degree of Doctor of Music, but Brahms seems to have ignored the intended courtesy.

By his 'German Requiem,' produced in the Cathedral at Bremen in 1868, at a solemn re-

ligious function commemorative of the German soldiers who died in the war with Austria, he fully justified the prophetic utterance of Schumann and won for himself a place in the hearts of the whole German people. He called it the 'German Requiem' to indicate the difference in tone and spirit between it and the traditional requiem, which echoes the doleful strains of the 'Dies Iræ.' In the 'German Requiem' buoyant hope and assurance of God's infinite mercy is the keynote. It is one of a class of sacred compositions, 12 in number, among them the 'Triumphlied' (song of triumph), commemorating the German victories in the war with France in 1871-2, also some choral songs and motets. His other compositions, numbering about 150 pieces, are his secular choral works, among these Schiller's 'Nanie' and the 'Gesang der Parzen' (song of the Parcae); concerted vocal works, among them the 'Liebeslieder' (lays of love); orchestral works, among them four symphonies; chamber music; piano-forte solos; four books of Hungarian dances arranged for piano-forte duet. He never seems to have even attempted to compose an opera, and confessed a distaste for that combination of music and drama. He seldom visited the theatre, and on the rare occasions on which he attended operatic performances he nearly always retired before the completion of the last act.

Brahms is ranked with the classic masters of music, as the peer of Beethoven and Mendelssohn, and inheritor of the traditions of the great school of the German composers. Temperamentally and in his mental habit he is essentially modern, original, and spontaneous; he possesses the warmth of imagination and the quick emotionalism which are assumed to be characteristic of the romantic school, and to these he gives free play. But his creations are cast in the classic molds; or rather they appear to come to the birth naturally in classic forms; hence there is no shadow of incongruity between the matter and the form. See Deiters, translated by Newmarch, 'Brahms: a Biographical Sketch' (1888); Dietrich and Widmann, translated by Hecllet, 'Recollections of Johannes Brahms' (1899).

Braid, James, Scotch physician: b. Fife, 1795; d. 25 March 1860. He studied medicine in Edinburgh, and settled as a surgeon in Manchester. He is noted for his researches on animal magnetism, which he first called neurohypnotism, and afterward termed hypnotism.

Braidwood, Thomas, Scotch educator: b. 1715; d. 24 Sept. 1798. He studied at the University of Edinburgh, settled as a schoolmaster in that city, and after 1760 became famous as a teacher of deaf-mutes. In 1783 his school was transferred to Hackney, London.

Braille, Louis, loo-ê brāl, or brā-ê, French educator of the blind: b. Coupvray, 1806; d. 1852. He invented a system of writing with points, used extensively in institutions for the blind. Himself blind almost from birth, at the age of 10 years he was admitted to the Institute for the Blind in Paris, where he soon became proficient in both science and music. In instrumental music he attained a very high rank, becoming one of the most distinguished organists of Paris, and excelling also as a violoncellist. At the age of 20 he had formed the idea of modifying M. Charles Barbier's system of

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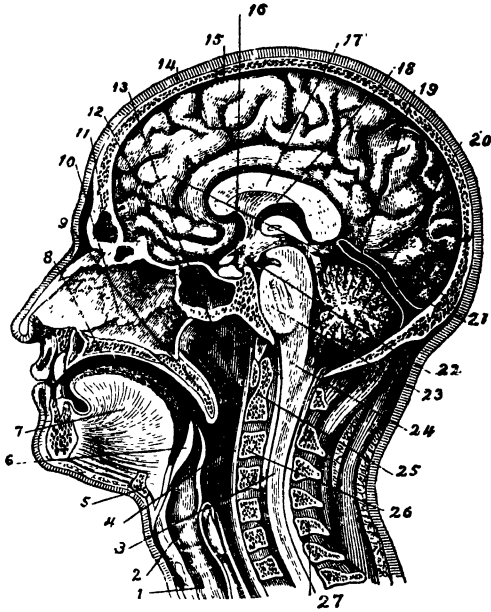


Fig. 1.

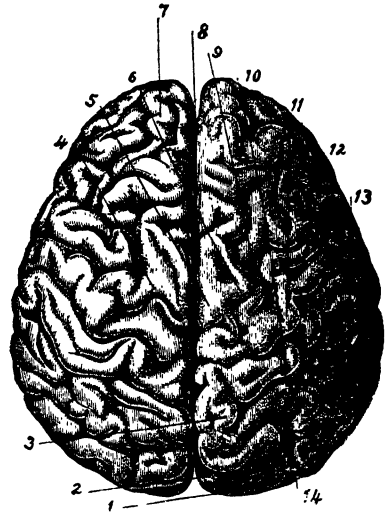


Fig. 3

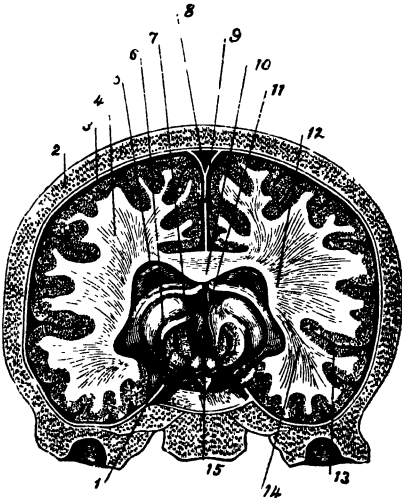


Fig. 2.

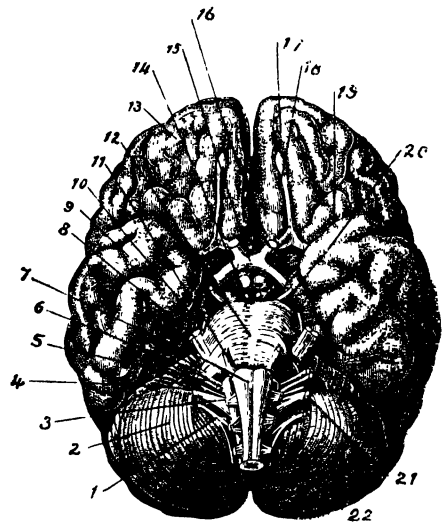


Fig. 4.

BRAIN

writing with points so as to render it practicable and convenient, and not long afterward it was introduced into the royal institute, although no account of it was published till 10 years later. It was subsequently adopted in most of the continental schools, and a little later in the United States, where it continues, with some modifications, in successful use. The signs of the original system are 43 in number, embracing the entire alphabet, all the diphthongs, and marks of punctuation. Ten fundamental signs form the basis of all the rest. These signs, representing the first 10 letters of the alphabet and the 10 Arabic numerals, are as follows:

A	B	C	D	E	F	G	H	I	J
·	:	··	··	·	··	··	··	·	··
1	2	3	4	5	6	7	8	9	0

By placing one point under the left side of each fundamental sign, the second series is formed, comprising the next 10 letters. By placing two points under each fundamental sign, the third series, comprising U, V, X, Y, Z, Ç (C soft), Ê, Â, È, Û, is formed. By placing one point under the right side of the fundamental signs, the fourth series, embracing Â, Ê, Î, Ô, U, È, Û, Æ, W, is formed. Three supplementary signs represent Ì, Æ, and Ò. The marks of punctuation are the fundamental signs placed two lines below. The system has been applied to musical notation in such a manner as to make the reading and writing of music much easier for the blind than for those who see. The seven notes are represented by the last seven of the fundamental signs, and each of these notes may be written in seven different octaves by merely prefixing a sign peculiar to each octave, and thus the necessity of designating the key of each musical sentence in the ordinary way is avoided. The mode of writing is very simple. The apparatus consists of a board with a surface grooved horizontally and vertically by lines one eighth of an inch apart. Over this board a frame is fitted like that of the common map delineator, and one or more sheets of paper being placed over the board, the points are made with a bodkin, through a slip of perforated tin, ::, which contains all the changes used in the system. As the sheet must be reversed to be read, the writing should be from right to left, that it may be read from left to right. Of course, several copies may be made by one operation. For many years books have been printed in points in various countries. See BLIND.

Brain, that portion of the nervous system contained, for the most part, within the skull. It is usually divided into two parts. The larger mass is termed the cerebrum, the smaller, the cerebellum; from the lower end of the cerebrum the medulla oblongata tapers down into the spinal cord. The brain is, as it were, the great central station of the nervous system. From the surface of the entire body nerve fibres pass into the spinal cord, up the cord and into the brain; these carry impressions of all kinds—touch, taste, sight, hearing, pain, temperature, etc.—from the surface to the brain. Starting in the brain mass itself there is a corresponding series of fibres that run down into the medulla and spinal cord, out into the nerves and end in some muscle or organ of special character. There are literally thousands of incoming fibres, thousands of outgoing fibres and millions of minute cells in direct association with these fibres. Thus it may be seen that the brain is merely a collection of nerve ganglion cells and their associated fibres, both of which have a characteristic appearance as seen by the naked eye; that portion of the brain that preponderates in cells is the "gray matter," and that portion richer in fibres is the "white matter."

Cerebrum.—The larger brain mass, the cerebrum, consists of two symmetrical halves, the hemispheres, separated above by the great longitudinal fissure and held together at the bottom of the fissure by a firm band of fibres, the callosum, and at the base by the cerebral peduncles, which unite below to form part of the pons, and the medulla. All of the fibres passing to and fro go up and down in the peduncles, separating into each hemisphere. The surface of the hemispheres is divided by fissures into several larger areas and a number of smaller ones. Thus in the lower side there is a large fissure, the fissure of Sylvius, below it there are three lobes, the first, second, and third temporal lobes. Running from the great longitudinal fissure, making an angle of about 65° with the Sylvian fissure, the second most marked fissure, that of Rolando, is found. This divides off an anterior region in which the first, second, and third frontal convolutions are to be found. Immediately around the fissure of Rolando are grouped the anterior and posterior parietal lobes, and at the back end of the hemispheres the occipital lobes are situated. All of these lobes are divided into smaller areas by the fissures, the chief end subserved by these fissures being to

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FIG. 1.—HEAD AND NECK, SECTION FROM FRONT TO BACK.

1, Wind-pipe; 2, Larynx; 3, Spinal marrow; 4, Pharynx; 5, Tongue or Hyoid bone; 6, Epiglottis; 7, Tongue; 8, Hard palate; 9, Soft palate; 10, Bridge of the nose; 11, Frontal cavity; 12, Sphenoid cavity; 13, Nasal cavity; 14, Skin of the skull; 15, Bony skull; 16, Hypophysis; 17, Corpus callosum; 18, Septum lucidum; 19, Straight sinus; 20, Cerebellum; 21, Cerebrum, right hemisphere; 22, Lobes of the Medulla; 23, Pons Varolii; 24, Medulla Oblongata; 25, Zone of the Epistropheus; 26, Vertebrae; 27, Spinal continuation of the Vertebrae.

FIG. 2.—BRAIN, CROSS-SECTION FROM LEFT TO RIGHT.

1, Thalamus; 2, Skull; 3, Cerebral membrane; 4, Cerebral hemisphere; 5, Lateral ventricle; 6, Optic lobe; 7, Septum lucidum; 8, Longitudinal sinus; 9, Great longitudinal fissure; 10, Corpus callosum; 11, Median cerebral cavity; 12, Cerebral hemisphere; 13, Gray matter; 14, White matter; 15, Corpora Albicantia.

FIG. 3.—BRAIN VIEWED FROM ABOVE.

1, Occipital convolution; 2, Occipital lobe; 3, Inner

parietal convolution; 4, Left cerebral hemisphere; 5, Inner frontal convolution; 6, Right cerebral hemisphere; 7, Frontal lobe; 8, Longitudinal fissure; 9, Median frontal convolution; 10, Occipital centre convolution; 11, Frontal centre convolution; 12, Outer frontal convolution; 13, Outer parietal convolution; 14, Median parietal convolution.

FIG. 4.—BASE OF THE BRAIN.

1, Eleventh or spinal accessory nerve; 2, Right hemisphere of cerebellum; 3, Twelfth or hypoglossal nerve; 4, Ninth or glossopharyngeal nerve; 5, Eighth or auditory nerve; 6, Seventh or facial nerve; 7, Medulla Oblongata; 8, Fifth or trigemenuus (trifacial) nerve; 9, Central lobe; 10, Fourth or trochlear nerve; 11, Sixth or abducent nerve; 12, Pons Varolii; 13, Right frontal lobe of the cerebrum; 14, Lobes of the medulla; 15, Optic chiasm; 16, Second or optic nerve; 17, Left frontal lobe; 18, First or olfactory nerve; 19, Sylvian fissure; 20, Third or ocula-motor nerve; 21, Tenth or pneumogastric nerve; 22, Left hemisphere of the Cerebellum.

BRAIN

increase the amount of outside surface of the hemispheres and thus make room for the enormous number of cells that are located in this outermost gray layer, the cortex. A further function seems to be expressed by this division into lobes and convolutions, namely, a localization of function, a concentration of energy as it were, certain types of brain activity being regulated in certain brain areas. Thus it is assumed that the main function of the frontal lobes is largely that of the reasoning faculties and higher intellectual processes. It is very well established that the cells in the cortex that are grouped up and down both sides of the fissure of Rolando are the cells that govern the motor acts of the body; irritate these, and muscular convulsions in certain groups will occur; destroy them by accident or disease, and paralysis, or loss of muscular function, will result. The localization for certain muscle groups, such as those for the head, arm, eyes, leg, etc., are very well known. In the occipital lobes, particularly in certain areas about the angular gyrus, are the centres for sight memories. Their destruction may result in mind blindness (see *APHASIA*). In much the same manner the memories of sound are located in the temporal convolutions, and there are a large number of areas thus localized. These different areas are all brought into connection, the one with the other, by hosts of fibres, and as already indicated the two hemispheres of the cerebrum are connected by thousands of fibres that are in the callosum. Thus in the adult normal cerebrum all parts of the cortex are brought into close connection with one another and with the other half of the cerebrum; the connections with the cerebellum and with the cord are established as well. The richness of association is an index of the education and intelligence of the individual. These cortical connections are not a helter-skelter, hit-or-miss system; they are all carefully laid down, constituting the human brain one of the most remarkable "switchboards" ever made. Modern anatomy is busy unraveling all the fibres and bundles of fibre tracts, and it will not be many years before the map of the brain will be as well known as that of New York. When that time arrives many unknown problems of nervous and mental disease will be solved and the hideous secrets of the insanities will be laid bare.

In addition to the cortical ganglionic masses of cells, there are a number of similar masses of cells located within the substance of the brain mass. These are subsidiary stations, as it were, for many of the fibre tracts going to and coming from the cortex. These are the caudate and lenticular nuclei, the optic-thalamus, and a number of smaller ones.

Cerebellum.—The cerebellum, or little brain, is situated behind and almost beneath the cerebrum, which partly overlaps it. It is attached to the brain stem by peduncles and its connections with the cerebral centres and those of the cord are many and complex. In minute structure the cerebellum has a number of characteristic features by which it may be recognized under the microscope, but fundamentally the nerve cells are similar, the interstitial connective tissue is the same in kind as in the cerebrum and the blood vessels, veins, and lymphatics have similar properties.

Membranes.—Surrounding the entire brain mass and extending down over the spinal cord there are three coverings. These are an outside strong and thick dura mater, and two inside delicate membranes, the arachnoid and pia mater.

Cavities.—The brain is not a solid organ. It is really a flattened-out expansion of nervous tissue peculiarly grouped about a central cavity. This central cavity at one time was as simple almost as the space occupied by the graphite in a lead pencil, but in the adult brain there are lateral ventricles, third and fourth ventricles, all of which are too complicated to be described here. The ventricles contain a fluid, the cerebro-spinal fluid, which also bathes the outside of the brain. The cavities of the brain are continuous with the central cavity of the spinal cord.

This modern conception of the brain as a complicated automatic switchboard may be elaborated to any amount of detail. If one should trace, however, the path of a single impulse from the outside world, be it one of sight, smell, taste, touch, pain, etc., one would trace it, say for pain—first from the point of contact, for instance, of the finger, whence the special nerves of sense would carry it to the spinal cord; here it travels up a definite tract in the cord (for the upward paths of the passages of sensations and the downward ones of messages to act are as definitely known as are the railroads from New York to Chicago); from the cord it passes into the medulla, still in a well-defined path, where only it and its kind travel (about here the fibre tract crosses to the opposite side of the medulla); then through the pons, through the cerebral peduncles, up to the secondary centres, to the cerebellum and the sensory area in the cortex, which is supposed to be situated just behind the motor area. As soon as the sensory impulse reaches the cortex it is felt as pain and referred to the spot in the skin in contact with the irritant. Immediately in the perception of pain, so intimate are the connections of the sensory areas with the motor areas from these motor cells a conscious impulse is flashed down another series of fibres, down the peduncles to the medulla (where the fibres also mostly cross to the opposite side), down the spinal cord, out on a motor nerve to the muscle to cause a muscular act of pulling the hand away from the harmful irritant. This is the long, conscious series. There may also have been a shorter reflex cycle whereby the impulse passed to the spinal cord and an immediate motor connection was made that caused a quick jerking away of the hand, even before the perception of the sensation had taken place. This is the reflex cycle. See *REFLEX ACT*.

The study of the comparative anatomy and physiology of the nervous system is one of the most enchanting departments of human knowledge. To trace the gradual development of this intricate and marvelously adjusted regulator of the entire body, from its simplest terms of "protoplasm irritability" through the isolated ganglionic masses in such animals as the starfish, the gradual chaining of one mass to another as in the worms and insects, thus bringing a certain relation of one part to another, up to the fusion of different ganglionic masses to form a chief mass, the brain, and secondary masses, the spinal cord—this is a story of so many chapters and volumes that it cannot even be sketched here; but it is

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very certain that the gradual evolution of the nervous system shows the extreme complexity of man's activities. Although throughout the entire series, nerve cells are alike, it is only in the great multiplicity of co-ordinations and connections that man's brain differs from the nervous system of a jellyfish or a worm. It is only in the animal series beginning with *Amphioxus* that a distinct brain mass commences to be seen. But from this point forward the modification in form, size, and complexity is gradual. While man has the most complex brain, he has not the heaviest brain, although in comparison with his size it is the heaviest. The brain of man is usually heavier than that of woman, although at birth and at the age of 14 the female brain is heavier. Taller and heavier persons have usually heavier brains. Weight of brain, however, has no direct relationship with intelligence, as idiots' brains are known that have weighed as much as those of many of the ablest of men. Intellectual capacity, as already said, consists in the great multiplicity of nerve cell connections. In which connection it might also be added that the shape and size of the outside skull bears no constant relation to the shape and size of the inside brain. Cuvier's brain weighed 84 ounces, Gambetta's only 39 ounces. While it is true that a number of celebrated men of recognized brain power have had large brains, there are many more of equal capacity whose brain weights have not been remarkable. Also see MOTOR AREA; MOTOR CO-ORDINATION; NERVOUS SYSTEM; SENSORY AREA; SIGHT CENTRES; SOUND AREAS; SPEECH CENTRES; TASTE AREAS.

Consult: Barker, 'The Nervous System' (1901); Schafer, 'Physiology' (1900).

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Brain, Diseases of. These are so many and so diverse that a general article cannot readily be written upon them. In general they may be divided into: (1) Developmental defects. These are considered under idiocy, imbecility (q.v.), etc. (2) Acute infections in which the brain itself or its surrounding membranes are attacked by some form of bacterium, such as the influenza bacillus, the pneumococcus, that ordinarily is the main cause of pneumonia, the typhoid organism, or certain forms of cocci. These diseases are discussed under the heads, euephalitis, meningitis, cerebral abscess, epidemic cerebro-spinal meningitis (q.v.). (3) Acute and chronic poisoning, including delirium tremens in alcoholism (q.v.), toxic manias (q.v.), etc. (4) Diseases of the blood vessels of the brain. Here is to be classed the general disease apoplexy. This is really three different diseases due to cerebral hemorrhage, cerebral thrombosis, or cerebral embolism. These are discussed here. In all, the symptoms are much alike, as similar areas in the brain may be affected by each. In hemorrhage there is a bursting of one of the cerebral blood vessels, with pouring out of blood into adjacent brain tissue and destruction. A certain blocking of the artery also results. In thrombosis, the walls are diseased and a soft mass collects on the inside of the blood vessel in the brain and blocks it up. This shuts off the circulation in a certain area supplied by the artery and there is degeneration in that area with softening perhaps and cyst formation. In embolism some foreign

body from some other part of the arterial system is swept into a blood vessel of the brain and blocks it up. In all three forms of apoplexy the attack may be very slight, if the cause is slight, a temporary loss of consciousness, or a paralysis in one limb, or a hemiplegia that is transitory—these may be all that is noted. But the usual attack of apoplexy is much more severe. The patient is rendered unconscious, the face is purple or congested, there may be voiding of urine and feces, the breathing is slow and snoring in character, the pulse is usually slowed to 50, and often soft and full; nausea and vomiting and lowered temperature may also occur. The pupils may be dilated and the eyes may appear crossed. There is usually noted a difference in the two sides of the face, one side of the body is different from the other, and on lifting the limbs there is a change in their resistance. The patient may remain in this condition and die very soon, or he may have a rising temperature for a week and then die, or he may recover consciousness to find that one entire side of his body is paralyzed, or incapable of being moved by the will. If the right side is involved the patient usually has defects in his speech (aphasia, q.v.). After a few days, this paralysis may pass away, but it usually persists for life in some form or other. Almost invariably the paralyzed limbs improve greatly; at first the leg and later the arm, and the improvement may be very great so that only a slight trace of what was a disabling affliction remains. The shades and variations in symptoms and in the outcome are numberless. The treatment of an attack of apoplexy requires prompt attention. Heat to the extremities, mustard bath to the feet, absolute quiet, removal of constricting bands about the neck, placing the patient on the non-paralyzed side, in many cases blood-letting; these are the generally recognized things to do. The outlook is always serious. Hemorrhage is apt to occur in those over 50, thrombosis in those affected with syphilis, and may occur at any age, embolism usually accompanies some infectious disease, such as pneumonia, rheumatism, scarlet fever, childbirth fever, etc.; and may affect old or young (see DIPLEGIA; HEMIPLEGIA; MONOPLEGIA). (5) Accident or injury to the brain. These may occasion various forms of hemiplegia; diplegia, particularly in the injuries of childbirth; epilepsy, etc. (6) Tumors of the brain (see TUMORS). (7) Organic disease of the brain functions. Here the various insanities may be classed. Softening of the brain is a term denoting either a dementia (q.v.) of old age, or the insanity known as general paresis (q.v.). The insanities will be classed under insanity (q.v.), and also under the titles: DEMENTIA PRAECOX; DEPRESSIVE INSANITY; MANIA; MELANCHOLIA; PARANOIA; etc.

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Brain Fever. See BRAIN, DISEASES OF THE.

Brainard, David Legge, American soldier and explorer: b. Norway, N. Y., 1856. Entering the United States army in 1876 he served in Indian campaigns and subsequently accompanied the Greely Arctic expedition 1881-2. He was sergeant in the signal service, served in the Alaskan relief expedition in 1897 and went to the Philippines in 1900 as a major in the subsistence department of the regular army.

BRAINARD — BRAINTREE RESOLUTIONS

Brainard, John Gardiner Calkins, American poet and journalist: b. New London, Conn., 21 Oct. 1796; d. 26 Sept. 1828. After graduation at Yale in 1815 he studied law and practised at Middletown, Conn. In 1822 he went to Hartford and edited the *Connecticut Mirror*, in which many of his early poems appeared. In 1827 he was forced by failing health to resign his editorship. For a time he resided on Long Island, whence he returned to New London to end his days. He issued a volume of poems in 1825, a second and fuller edition of which, under the title of 'Literary Remains,' was published in 1832, with a biographical sketch by John Greenleaf Whittier.

Braine, Daniel Lawrence, American naval officer: b. New York, 18 May 1829; d. 30 Jan. 1898. He entered the United States navy in 1846 and became a rear admiral. He served with distinction through the Mexican and Civil wars. In 1873 he obtained the surrender by Spain of 102 survivors of the *Virginus* prisoners.

Braine-le-Comte, brân-lè-könt, Belgium, a small and ancient town of the province of Hainaut, about 20 miles southwest of Brussels. It contains a handsome church, founded in the 13th century, and a large well-built château. The Southern Railway branches off from this town, on the west side to Mons and Quévrain, east to Namur and Charleroi. Among its manufactures are breweries, wire-works, dyeworks, oil-, cotton-, and corn-mills. At one time it manufactured and dealt extensively in tin wares, but this branch of trade is almost if not entirely extinct. Pop. (1899) 8,891.

Brainerd, David, a missionary to the Indians: b. Haddam, Conn., 20 April 1718; d. Northampton, Mass., 9 Oct. 1747. Early impressible by religious influences, he felt himself suddenly converted while taking a walk, 12 July 1739, and the same year entered Yale College to prepare himself for the ministry. Instead of graduating in the regular course he was expelled from the institution in 1742 for having said, in his zeal, of one of the tutors, that he had no more of the grace of God than a chair. He was, however, licensed in July as a preacher, and received an appointment from the society for the propagation of Christian knowledge, as missionary among the Indians near Stockbridge, Mass. He was ordained in 1744, and took up his work among the Indians at the forks of the Delaware in Pennsylvania, making two visits to the Indians of the Susquehanna. He met, however, with but little success, until, after a year, he went to reside among those at Crossweksung, near Newark, N. J. Here he is said to have produced a great change among the savages, and to have baptized 78, of whom 38 were adults. Having worn out his health by his labors, he set out on a journey to Boston in the spring of 1747, and thence to Northampton, where he died after a short stay in the family of President Edwards, by whom his biography was soon afterward written. His published works are: 'Wonders of God Among the Indians,' and 'Grace Displayed.'

Brainerd, Minn., a city and county-seat of Crow Wing County, 115 miles west of Duluth, situated on the east bank of the Mississippi River and on the Brainerd & N. R.R. It lies in a fertile farming region and trades in grain

and other agricultural produce. Lumber and furs are also exported. Here are situated the extensive shops of the Northern P. R.R. There are foundries, flour-mills, a large saw-mill, etc. There is a United States signal service station, a hospital for employees of the Northern P. R.R., and another for lumbermen, a public park, waterworks, electric street railway, electric lighting plant, etc. The city is governed by a mayor, elected biennially, and a city council. Pop. (1900) 7,524.

Brain'stone Coral, a madreporæ of the genus *Meandrina*, so named from the general resemblance to the brain of man exhibited in its large rounded mass and numerous winding depressions. When the hemispherical mass is broken, the ridges which bound its furrows (each of which represents the place of a polyp) may be traced inward through its substance, even to the central nucleus from which they began.

Brain'tree, Mass., a town in Norfolk County, on the New York, N. H. & H. R.R., 10 miles south of Boston. It contains the villages of South and East Braintree; is connected by electric street railroads with the principal neighboring towns and villages, and its industries include granite-quarrying, and the manufacture of rails, tacks, shoes, wool, rubber goods, fans, etc. John Adams, John Quincy Adams, and John Hancock were born in a part of Braintree now within the limits of Quincy. Pop. (1900) 5,981.

Braintree Resolutions, *The*. There were instructions given by the town of Braintree, Mass., on 24 Sept. 1765, to its representative in the Massachusetts General Court, Ebenezer Thayer, relative to his action in the matter of the Stamp Act. They were drawn by John Adams, one of a committee appointed by the Braintree town meeting for that purpose, accepted unanimously, and published in the *Boston Gazette*. Some 40 Massachusetts towns subsequently adopted them verbatim as their instructions to their own representatives; and John Adams says that Samuel Adams copied several paragraphs into his own draft for the Boston town-meeting. The resolutions declared the tax, even if legal, an unbearable burden and a vexatious interference with the business of a poor and sparsely settled province; that moreover, it was contrary to British common law, and the "foundation principles of the British constitution, that we should be subject to any tax imposed by the British Parliament, because we are not represented in that assembly in any sense, unless it be by a fiction of law"; that to put the cases in the decision of one judge without a jury was "an alarming extension of the power of courts of admiralty," and repugnant to the Great Charter itself, especially as the judges held office only during the pleasure of the Crown, and moreover had a commission on the goods condemned. They enjoin the Braintree representative to "comply with no measures or proposals" for executing the law, but "by all lawful means" obstruct it; to favor entering on the public records "the most clear and explicit assertion of our rights and liberties"; and—most significant of all—"to agree to no steps for the protection of the stamped paper or the stamp officers, because any addition to the laws for preserving the peace would only exasperate the people and endanger public tranquillity."

Braith, Anton, än'tōn brīt, German painter: b. Biberach, Wurtemberg, 1836. He was educated at the Stuttgart Art School and the Munich Academy, and soon obtained distinction by his skill in landscape and animal painting. Among his best works are 'A Yoke of Oxen'; 'A Grazing Herd'; 'Going to Drink'; 'Herd Overtaken by a Storm'; 'After the Storm.'

Brake, Bracken, common names for a fern (*Pteris aquilina*) of the family *Polypodiaceæ*, widely distributed in Europe, Asia, and North America, where it often dominates the vegetation of heaths, neglected meadows, etc. It does not fall when the top is killed by frost, and affords excellent cover for small game. From its long, creeping rootstocks, naked stalks, 6 to 20 inches in length, are sent up. Each stalk produces three branches with numerous fern-like pinnate leaves, along the covered edges of which are borne the sori, or spore-producing organs. The rootstock, which is bitter, has been used as a substitute for hops in beer-making, and is still somewhat employed in dressing chamois and kid leather. The tops are often used for bedding animals, and are sometimes mixed with hay as fodder. Although land covered with brake is considered inferior, many such soils, when cultivated, are found to be good. By frequent mowing, or by plowing, the land is readily freed from brake. Several other species of *Pteris* have been called brake and bracken, and some are cultivated as ornamental plants in greenhouses and window-gardens. The rootstocks of a New Zealand species (*P. esculenta*) are often used for food, and are better suited for such use than those of the first-named species, which have served such a purpose only when ordinary food-supply has been scarce.

Brake, a mechanical devise for retarding or arresting by means of friction the motion of a wheel or shaft. A wood or metal block, so arranged as to be pressed by levers against the rim of a wheel, constitutes a shoe-brake, the kind used in checking ordinary vehicles, such as wagons. A band passing around a wheel, and which, by tightening, retards its motion, forms a band-brake. The air-brake is the form of mechanism generally used on railroads. See AIR-BRAKE.

Brakelonde, Jocelin de, English chronicler: b. Bury St. Edmunds, in the 12th century. In 1173 he entered the convent of St. Edmunds and began his chronicle which extends over a period of nearly 30 years. The character of the abbot, Samson, described in these annals, influenced Carlyle in the writing of 'Past and Present.'

Bramah, brä'mä, Joseph, inventor of the Bramah lock, the Bramah press, etc.: b. Stainborough, Yorkshire, England, 1749; d. 1814. He was first apprenticed to a carpenter and joiner, but finally established himself in business in London as manufacturer of various small articles in metal-work. His subsequent life was distinguished by a long series of inventions, many of which have been found of great utility. Beside those already mentioned, he invented the apparatus used in public houses to bring liquids from the cellar to the bar, and ingenious printing machines. He also made improvements in fire-engines, steam-engines, the manufacture of paper, etc.

Bramante, brä-män'të, Donato d'Agnolo, Italian architect: b. Monte Asdroaldo, near Urbino, about 1444; d. 11 March 1514. He applied himself first to painting, but his passion for architecture soon gained the ascendancy, and he shares with Brunelleschi the credit of restoring this art. While yet a young man he went to Milan, where his time was mainly spent at the cathedral. Pope Alexander VI. named him as his architect, and Julius II. made him superintendent of his buildings. At the command of the latter he united the Belvidere with the palace of the Vatican. He persuaded the Pope to order the Church of St. Peter to be torn down, and another to be erected in its place, which should be without an equal in the world. In 1513 the foundation of the present St. Peter's was laid, according to the plan of Bramante. It yet remains the greatest achievement of modern architecture. Bramante did not live to see this work completed. He had begun the edifice with incredible dispatch, but his successors, Raphael, Julius of San Gallo, Peruzzi, and Michael Angelo, altered the original plan, and left nothing of Bramante's workmanship standing except the arches which support the tower of the dome. His writings, in prose and verse, first discovered in 1756, were printed in the same year at Milan.

Bramathërium, a genus of antilopidæ, consisting of a gigantic species with four horns. It is allied to sivatherium, which also is four-horned. Both occur in the Upper Miocene, or Lower Pliocene beds of the Sewalik Hills in India.

Brambach, Kaspar Joseph, kas'par yō'zëf bräm'ban, German composer: b. Bonn, 14 July 1833. He was a pupil at the Conservatory in Cologne (1851-4), and at Frankfort-on-the-Main he studied under Ferdinand Hiller. In 1859 he became a teacher at the Cologne Conservatory, and in 1861 went to Bonn as state musical director. Giving up that position in 1866, he devoted himself to the work of composing and private teaching. His best works are his cantatas, including 'The Eleusinian Festival'; 'A Hymn to Spring'; 'The Power of Song'; 'Alcestis'; 'Prometheus'; 'Colombus'; and 'Lorelei.' He has also written an opera, 'Ariadne,' and several minor pieces.

Brambanan, bräm-ba'nän, a district of the province of Surakarta, Java, rich in remains of Hindu temples, of which there are six groups, with two apparently monastic buildings. The edifices are composed entirely of hewn stone, and no mortar was used in their construction. The largest is a cruciform temple, surrounded by five concentric squares, formed by rows of detached cells or shrines, embracing an area 500 feet square. In several of these *dagobas* the cross-legged figures of Buddha remain, but the larger figures which must have occupied the central temples have disappeared from all but one.

Bramble, a common, but, in America, little used name for various species of the genus *Rubus*, including blackberry, raspberry, and dewberry. In Europe it is more restricted to *R. fruticosus*, which, from its abundance and its weedy character, has not received the attention of horticulturists.

Brambling, or **Mountain Finch**, a large migratory finch (*Fringilla montifringilla*), found throughout Europe and in Asia, where it breeds

BRAMHALL—BRANCHIOPODA

in the northern parts. It is a brightly colored bird, and nearly related to the chaffinch (q.v.).

Bramhall, brām'hôl, John, Anglican prelate in Ireland: b. Pontefract, Yorkshire, England, 1594; d. 25 June 1663. He was educated at Cambridge, and was on the road to high preferment when he went to Ireland as Wentworth's chaplain in 1633. He soon became archdeacon of Meath, and was consecrated bishop of Derry in 1634. When the civil war broke out, for safety he crossed to England, but the Royalist disasters soon drove him to the Continent. At Paris he disputed with Hobbes on necessity and the freedom of the will. At the Restoration he was given the metropolitan see of Armagh. Bramhall closely imitated Laud in policy, and even resembled him in person, but was far his inferior in intellect. Not strong, but merely obstinate in purpose, the so-called Athanasius of Ireland by his impolitic intolerance sealed the doom of Episcopalian supremacy in Ulster.

Bramley, Frank, English artist: b. near Boston, Lincolnshire, 6 May 1857. He was educated at Lincoln and studied art at Antwerp. Among his works are 'Domino' (1886); 'Old Memories' (1892); 'For of Such is the Kingdom of Heaven' (1891); 'A Mute, Inglorious Milton' (1898); and several notable portraits.

Bran, the husks of ground corn, wheat, rye, or other cereals, separated from the flour. The nutritive value of these husks increases as we proceed from the outside of the grain toward the interior. The outer skin, or coarse bran, is very indigestible, owing to the presence of a layer of silica. The inner skins, called pollards, are more nutritious, containing from 12 to 15 per cent of nitrogenous matter, and from 20 to 30 per cent of starch. Unless ground very finely, however, they are apt to occasion irritation of the bowels and diarrhœa. Though rich in nitrogen, bran appears to possess but little nutritive power. It may be of use to the well fed, who need a laxative, but to the poor who need nourishment it is of very little use. It is, however, of some commercial value, being largely employed in the feeding of horses and cattle, and in brightening goods during the processes of dyeing and calico printing.

Branca, Ascanio, Italian statesman: b. 1840. He studied law at Naples and did journalistic work, and in 1870 was elected to the Italian Chamber of Deputies. He was later made secretary of the ministry of commerce but withdrew from this position in 1885, disapproving of the policy of the ministry. In 1891-2 he was minister of public works in Rudini's cabinet; in 1896-8 minister of finance, and in 1900-2 again minister of public works. He has written 'International Banking and Credit' (1871).

Branch, John, American statesman: b. Halifax County, N. C., 4 Nov. 1782; d. Enfield, N. C., 4 Jan. 1863. He graduated at the University of North Carolina (1801), studied law, became a judge of the superior court, State senator (1811-17). He was governor of his State (1817-20), and a member of the United States Senate (1823-9). He was appointed secretary of the navy by President Jackson, and held this office till the breaking up of the Cabinet in 1831. In 1835 he was a member of the convention to

revise the State constitution, and in 1843 was appointed governor of the Territory of Florida, serving until the election of a governor under the State constitution, when he retired to private life. See Lanman: 'Biographical Annals of the Civil Government of the United States.'

Branch, Mary Lydia Bolles, American writer of stories for young people: b. New London, Conn., 13 June 1840. She was married to John L. Branch in 1870. Her published works include 'The Kanter Girls' (1893); 'The Old Hempstead House' (1896).

Branch, that portion of a plant produced from a lateral leaf bud on the primary axis or stem. It is looked upon as part of the stem, and not as a distinct organ. A branch generally produces secondary branches, and these give rise to minor ramifications, called branchlets or twigs. The different modes in which branches spring from the stem give rise to the various forms of trees: such as pyramidal, spreading, and weeping. Thus, in the cypress, the branches are erect, forming acute angles with the upper part of the stem; in the oak and cedar, they are spreading, each forming nearly a right angle; in the weeping ash and elm, the angles are oblique; while in the weeping willow and birch, the branches are pendulous, from their flexibility. The comparative length of the upper and under branches also gives rise to great differences in the contour of trees, as seen in the conical form of the spruce, and in the umbrella-like shape of the Italian pine.

Branchial Cysts and Fistulas. In early fetal life the human being possesses a series of four gills or branchi, and five clefts on each side of the head and neck, which in the course of development give rise to the upper and lower jaw and other structures. Should a cleft fail to completely fill in as the body grows it leaves a cavity or branchial cyst, which may at any time become inflamed or develop an abscess. If the opening on the neck persists it is a branchial fistula.

Branchiata, a name applied to all those marine arthropod animals which breathe by gills. The groups include the trilobites, merostomes, and crustacea, but excludes the arachnida. On this account the branchiata is believed by the best authorities to be an artificial group, and the term has therefore been abandoned.

Branchidæ, the name of an hereditary family, the descendants of Branchus; also of a place founded by them. Their original seat was a little south of Miletus in Ionia, where was the famous temple of Apollo Didymeus. After the destruction of the temple, probably toward the close of the 5th century B.C., an attempt was made to rebuild it, but on so colossal a scale that the project was never completed. Its ruins are of great interest to archæologists. Some of the statues, formerly erected along the road leading to the temple, have been removed to the British museum.

Branchiopoda, a division of crustacea of the division *Entomostraca*. They are for the most part microscopic, and are chiefly distinguished by having the gills attached to the legs, which are generally numerous. The body is sometimes naked, but more frequently is enveloped by a buckler, which in some covers only the head and thorax, and in others the whole

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body. Some have two or even three eyes, but a greater number have one only. They are all free and continually in motion. Among the *Branchiopoda* are the water-fleas and brine-shrimps, and some also rank the trilobites among them.

Branchiosaurus, an extinct genus of *Amphibia* (q.v.), whose remains have been found very abundantly and very perfectly preserved in the Permian shales of Saxony. It is of especial interest among fossil amphibians because it has been possible to study every stage of its development from embryo to adult. The animal was but a few inches long, proportioned like a salamander, with four limbs and five toes on each foot. Like the modern tadpole, the larva breathed by external gills which were replaced by lungs in the adult.

Branco, Rio, a river of north Brazil, the chief tributary of the Rio Negro. It is 400 miles in length, but 250 miles from its confluence with the Rio Negro navigation is blocked by falls.

Brand, Sir Jan Hendrik, Boer statesman: b. Cape Town, 6 Dec. 1823; d. 15 July 1888. He studied law in Leyden and in 1849 began to practice in the supreme court at Cape Town. In 1853 he became professor of law in the South African College. He early became prominent in public affairs, his sympathies being strongly pro-British. His influence prevented any participation of the Orange Free State in the movement to check British policy in South Africa. In 1863 he was elected president of the Orange Free State and was re-elected every five years until his death. Queen Victoria knighted him in recognition of his aid. Brandford was named in his honor, and Ladybrand was named in honor of his wife.

Brande, William Thomas, English chemist: b. London, 11 Feb. 1788; d. Tunbridge Wells, England, 11 Feb. 1866. He was educated at Westminster School, studied medicine and became an assistant to Sir Humphry Davy, succeeding him in 1813 in the chair of chemistry at the Royal Institution. In 1828 he became a superintendent in the mint. He wrote several standard books on chemistry. His chief works are: 'A Manual of Chemistry,' 'Outlines of Geology,' and an 'Encyclopædia of Literature, Science, and Art' (1842).

Brandeis, Frederick, American organist: b. Vienna, Austria, 1835; d. New York, 1899. At Vienna he studied under Fischhof and Czerny. In 1851 he settled in New York, and between 1865-98 filled positions as organist at the Catholic churches of St. John the Evangelist and St. James, and the 44th Street Synagogue, and the Church of Saint Peter and St. Paul in Brooklyn. He composed numerous instrumental and vocal pieces, but is best remembered for his song, 'My Love is Like the Red, Red Rose.'

Brandenburg, a province of Prussia, surrounded mainly by Mecklenburg and the provinces of Pomerania, Posen, Silesia, and Prussian Saxony. The soil consists in many parts of barren sands, heaths, and moors; yet the province produces much grain, as well as fruits, hemp, flax, tobacco, etc., and supports many sheep. The forests are extensive. The principal streams are the Elbe, the Oder, the Havel, and the Spree. Brandenburg carries on an active trade in manufactured articles, and includes, besides some

other districts, the greater part of the former Mark of Brandenburg, which formed the cradle of the Prussian monarchy, and the centre round which the present extensive kingdom has grown up. It is divided into the three administrative divisions of Berlin, Potsdam, and Frankfort, and has a total area of 15,381 square miles. The most of the inhabitants are Lutherans; the rest are chiefly Roman Catholics and Jews. From 1685 to 1688 many French refugees, Walloons, and inhabitants of Lorraine and of the Palatinate, settled in the Mark. At present Brandenburg is the most important of the Prussian provinces, including as it does the capital (Berlin), and the governments of Potsdam and Frankfort. The first people who are known to have inhabited Brandenburg were the Suevi. They were succeeded by the Slavonians, a barbarous people, whom Henry I. conquered and converted to Christianity in the early part of the 10th century. The government was first conferred on a Saxon count, and did not become hereditary till the time of Albert, whose son succeeded to the dignity of elector in 1180. This race becoming extinct, Charles IV. assigned the electorate to his son Sigismund, who became emperor in 1415, and sold the region to Frederick, burgrave of Nuremberg, the ancestor of the present reigning family. Frederick William the Great made various accessions to the territories of his ancestors, and obliged the king of Poland, in 1656, to declare Prussia an independent state. The Old Mark was ceded to Napoleon in 1807, and formed part of the kingdom of Westphalia; but it was restored to Prussia in 1814. The elector of Brandenburg held the seventh rank among the electors of the empire, and had five votes in the Council of Princes. Pop. (1900) 3,107,951. See PRUSSIA.

Brandenburg, a Prussian city, on the Havel, 35 miles west of Berlin, formerly the residence of the reigning family of Prussia. The Havel here expands into a lake, and divides Brandenburg into the Old Town, the New Town, and the Cathedral Island, the last containing a castle and the cathedral. The latter is a late Romanesque building (1170-1318), restored in the 19th century. The industries embrace woolen yarn, silk goods, baskets, leather, etc., and the building of boats is also carried on. Pop. (1900) 49,263.

Brandenburg, Confession of, a confession of faith issued in 1614 by the elector of Brandenburg. It was an attempt to reconcile the religious controversies growing out of the differences in Lutheran and Calvinistic doctrine.

Brandenburg, New. See NEU BRANDENBURG.

Brandes, Georg Morris Cohen, Danish literary critic of Jewish family: b. Copenhagen, 4 Feb. 1842. He graduated at the University of Copenhagen in 1864, and taught there, 1872-7. Several books on æsthetic and philosophic subjects brought on him a charge of skepticism which was not removed by an epoch-making series of lectures, delivered before large audiences, and published under the title, 'The Main Literary Currents of the Nineteenth Century' (1872-82); for his description of the later intellectual position of Europe, as broken away from the orthodoxy and romanticism of the beginning of the century, brought on him the bitter attacks of all the reactionary forces in Denmark. His 'Danske Digtere,' a masterpiece

of psychological analysis, appeared in 1877; but the hostility of his enemies induced him in the same year to leave Denmark, and settle in Berlin, where he published, among other works, critical biographies of Lasalle (1877); Esaias Tegnér (1878); and Lord Beaconsfield (1879). Then a lecture tour through Norway and Denmark brought a powerful party to his side, and in 1882 he returned to Copenhagen, his countrymen having guaranteed him an income of \$1,000, with the one stipulation that he should deliver public lectures on literature. Among his later works are: 'Den Romantiske Skole i Frankrig' (1882); a biography of Ludvig Holberg (1885); a valuable study of Shakespeare, published in an English translation in 1899; 'Impressions of Russia' (1888); 'Poems' (1899); 'Berlin as an Imperial Court.' Brandes is not only the foremost critic of Denmark, but one of the great literary critics of his age. His works have been translated into German and also into English and French.

Branding, a form of punishment once in use for various crimes, but abolished in England in 1823. It was performed by means of a red-hot iron, and the part which was branded was the cheek, the hand, or some other part of the body. When the practice of arresting judgment in criminal cases by Benefit of Clergy was in force, it was customary to brand on the left thumb any layman who received this benefit, since it was not permitted to a layman to enjoy it more than once. Even after branding had been abolished in all other cases it was for a long time retained in the army as a punishment for desertion, the letter D being marked on the left side of a deserter two inches below the armpit. It was not, however, properly speaking, branded on his side, but marked with ink, gunpowder, or some other substance which would leave a stain that could not be obliterated without destroying the skin at the part. This also has been abolished. In mercantile law the term refers to the stamping of some distinguishing mark upon manufactured articles. (See TRADE MARK.) In cattle-raising districts in the United States, Australia, etc., cattle are branded with the mark of the owner.

Brandis, Christian August, German philologist and historian of ancient philosophy: b. Hildesheim, 13 Feb. 1790; d. Bonn, 24 July 1867. After a course of philological and philosophical studies at Kiel and Göttingen, he graduated from the University of Copenhagen in 1812, and for a short time delivered lectures on philosophy. He was induced by Niebuhr in 1816 to accompany him to Rome as secretary to the Prussian embassy. From 1819 to 1821 he was engaged in conjunction with Immanuel Bekker in collecting materials for a new edition of Aristotle, published in four volumes at Berlin (1831-6). In 1821 he was appointed ordinary professor of philosophy at Bonn, and his professional duties at this university were continued during the rest of his life, being only interrupted by a residence of three or four years in Greece, where he was acting as counselor to King Otho. After his return from Greece he published an interesting and instructive work, for which his residence in that country had furnished him with materials, entitled 'Mittheilungen über Griechenland' (Communications on Greece) (1842), and at

the same time resumed his professorship at Bonn. His two most important works are his 'Handbuch der Geschichte der Griech.-Röm. Philosophie' (Handbook of the History of Greek and Roman Philosophy) (1835-60); and 'Geschichte der Entwicklungen der Griech. Philosophie' (History of the Developments of Greek Philosophy) 1862-4).

Brandis, Sir Dietrich, Anglo-German forester: b. Bonn, Germany, 31 March 1824. After taking a degree at the University of Bonn he was appointed superintendent of the forests of the East Indian provinces of Pegu in 1855 and was from that time till his retirement, in 1883, in the employ of the English government, with the rank of inspector-general of forests to the Indian government. He was made a knight commander of the Indian empire in 1887. He is the author of several valuable monographs upon Indian forestry.

Brandon, a town of Manitoba, Canada, on the right bank of the Assiniboine, 132 miles west of Winnipeg. It is on the Canadian P. Ry, and has a trade in grain. The town contains a court house, banks, convent, collegiate institute, grain elevators, car shops, flour mills, etc. Pop. (1901) 5,738.

Brandon, Vt., a township of Rutland County, 16 miles northwest of Rutland, on the Central Vt. R.R., near Otter Creek. It contains an academy, two parks, a fine hotel, important marble quarries, flour mills, and manufactories of carriages, castings, paint, etc. Pop. (1900) 2,759.

Brandstetter, Hans, Austrian sculptor: b. Hitzendorf, near Graz, 25 Jan. 1854. He first studied wood-carving in Graz and later went to the Academy at Vienna where he was a pupil of Hellmers. His three earliest works won the prize given by the Academy; these are 'Lot's Flight from Sodom,' 'The Flute-player,' and 'Plato.' Among his other works may be mentioned his bronze 'Forest Lily,' 'Prometheus,' 'The Return of the Prodigal Son,' and the busts of Hamerling and Rosegger.

Brandt, Carl Ludwig, kárl lood'víg bránt, German-American painter: b. near Hamburg, Germany, 22 Sept. 1831. He studied art in European art galleries, came to the United States in 1852, and has since painted portraits and historical scenes. He became a member of the National Academy in 1872, and is a director of the Telfair Academy of Arts and Sciences at Savannah, Ga.

Brandt, Gerhard, Dutch Arminian clergyman: b. Amsterdam, 1626; d. there, 1685. After completing his studies and making himself a thorough Hebrew and Greek scholar, he became pastor of the Remonstrants, first at Nieukoop and afterward at Amsterdam. His works, almost all written in Dutch, include a 'Life of Admiral Michel Ruyter,' which has been translated into French; a 'Narrative of the Trial of Barneveld, Hoogerbeets, and Grotius'; and a 'History of the Reformation.' The last work, on which his fame chiefly rests, has been translated into English. It is remarkable for the elegance of its style, but written too much in the spirit of partisanship.

Brandt, Hermann Carl George, German-American educator: b. Vilsen, Germany, 15 Dec. 1850. He graduated from Hamilton College,

BRANDT—BRANDYWINE CREEK

Clinton, N. Y., in 1872; was instructor there (1874-6), associate professor of German at Johns Hopkins University (1876-82); and since 1883 professor of German at Hamilton. He has published a 'German-English and English-German Dictionary' (1879); 'German Grammar' (1884); a 'German Reader' (1889); and an edition of Lessing's 'Nathan der Weise.'

Brandt, Josef von, Polish painter: b. Szczepreszyn, 11 Feb. 1841. He first studied engineering at Paris, then took up painting at Munich as a pupil of Franz Adam and Karl Piloty and opened his own studio. His pictures mostly illustrate the soldier life of the 17th century, though he has painted also some excellent pictures of Polish peasant life. His works include 'Polish Peasants at the Inn,' 'Episode of the Thirty Years' War,' 'The Battle with the Turks near Vienna, 12 Sept. 1683,' 'Cossack Camp,' 'Tartar Battle,' 'Cossacks on the March,' 'Cossacks' Triumphant Song,' and 'Defense of a Farmyard by Polish Cavalry.'

Brandt, Marianne (family name, MARIE BISCHOF), German opera singer: b. Vienna, 12 Sept. 1842. She received her education at the Vienna Conservatory and won her first success on the stage as Recha in 'The Jewess.' She was at Gratz for a short engagement, and in 1868-82 was connected with the Royal Opera in Berlin; in 1876 and 1882 she assisted at the Wagner musical festivals at Bayreuth. After 1882 she made a number of tours and sang at the German Opera in New York for several seasons. She ranks very high both as a singer and an actress, her voice being a contralto.

Brandt, Max August Scipio von, German diplomatist: b. Berlin, 8 Oct. 1835. He served for a short time in the army, but was sent on diplomatic business to the East in 1860 and was resident in Japan as German diplomatic representative (1862-75). From 1875 to 1893 he was German minister at Peking. He has published 'Aus dem Lande des Zopfes' (1894); 'Die Zukunft Ostasiens' (1895); 'Sittenbilder aus China' (1895).

Brandt, Nicholas, German chemist of the 17th century, usually considered the discoverer of phosphorus. Leibnitz mentions him as a chemist of Hamburg, who, during a course of experiments on urine, for the purpose of discovering a solvent which would convert silver into gold, accidentally produced phosphorus, in 1667 or 1669. He communicated or sold his discovery to Kunkel, who showed it to Leibnitz. Boyle, securing a piece of the phosphorus, and knowing from what material it had been obtained, after various experiments succeeded in preparing it, and thus made an independent discovery of the method.

Brandy, the name most commonly applied to the spirit distilled from the juice of the grape, but also given to liquors distilled from other fruits, such as apples, cherries, peaches, etc. All these brandies differ from each other only in the essential oil which they contain, and which gives to each its different flavor and aroma. The alcohol in brandy generally constitutes 50 per cent of the whole, the remaining substances being water, amyl, propyl, and isobutyl, alcohols, glycerol, etc. The aroma is due to cenanthic ether and some volatile oils. A brandy highly esteemed is that of Cognac, exported from southwestern France, and obtained by distilling white

wines of the finest quality. An inferior kind of spirit is frequently prepared from the "marc" of grapes and the refuse of wine vats. When first distilled it is as colorless as alcohol, and continues so if kept in bottles or jars. When stored in casks, however, it acquires from the wood a pale amber tint, and in this state is sold as pale brandy. The dark color of brown brandy is produced artificially, to please the public taste, by means of a solution of caramel, and this is frequently added in excess to give a rich appearance to a brandy of low quality. A large proportion of the brandy sold in the United States is simply raw grain spirits flavored and colored. The spirit is imported into France, where it is redistilled and converted into French brandy. Brandy improves in flavor by being kept, but loses in strength. Genuine Cognac brandy has always been both costly and difficult to obtain in this country (the more so on account of the high import tariff collected thereon), the price for the liquor reaching \$20 or more per gallon. Of late years the development of viticulture in the western States, particularly in California, has enabled American enterprise to produce a brandy that is everywhere a formidable rival to the French article, and for purity and excellence infinitely preferable to the compounded and doctored spirit for which we have been accustomed to pay so high a price. Genuine brandy consists of alcohol and water, with small quantities of cenanthic ether, acetic ether, and other volatile bodies produced in the process of fermentation. The value of brandy as a medicine depends on the presence of these ethers and other volatile products; when, therefore, it is adulterated with raw grain spirit and water, the amount of these ethers is so reduced that the brandy becomes almost valueless for medical purposes. Imitation brandy is prepared either by flavoring highly rectified spirit with essence of Cognac or by distilling the spirit with bruised prunes, acetic ether, argol, and a little genuine brandy, and adding to the distilled spirit tincture of catechu and spirit coloring. This is said to be greatly improved by keeping. See ALCOHOL; DISTILLED LIQUORS.

Brandy Station, Va., a village of Culpeper County, southwest of Alexandria, notable as the scene of several minor battles during the Civil War. The earliest, on 20 Aug. 1862, was distinguished by a fierce cavalry charge on the Federal side; the second, 9 June 1863, resulted in the defeat of the Federal cavalry under Gens. Buford and Pleasanton by the Confederate commander Stuart. This was the most important engagement at this point, and is sometimes termed the battle of Beverly's Ford. Other battles were fought near here, 13 Sept. 1863; 11 Oct. 1863, as well as several skirmishes.

Brandywine Creek, a small river of Pennsylvania and Delaware, formed of two forks, the east and west, which effect a junction in Chester County of the first named State, and, taking a southeasterly course, empties into Christiana Creek two miles below Wilmington. At Chadd's Ford on the Brandywine, 11 Sept. 1777, was fought a severe battle between the British and German troops, 18,000 strong, under Howe, and the Americans, numbering 13,000 men, under Washington, in which the latter were defeated. The consequence of this battle was the occupation of Philadelphia by the British troops.

BRANFORD—BRANT

Branford, Conn., a borough of New Haven County, situated on Long Island Sound, and on the New York, N. H. & H. R.R., about seven miles southeast of New Haven. The harbor admits small vessels. The oyster-beds of Branford form an important industrial feature. Among other occupations are the quarrying of granite, and the manufacture of locks and iron-fittings. The Blackstone Memorial Library, one of the most notable of the smaller American public library buildings, is located here. The place was settled in 1643, and in 1667 a large number of the inhabitants removed to New Jersey, settling at Newark. Branford was named for Brentford, England, and was incorporated in 1893. Pop. (1900) township, 5,706; borough, 2,473.

Brangwaine, the name of the nurse of Yseult in the legend of Tristan. The name appears as Brangane in Wagner's opera, 'Tristan and Isolde.'

Branicki, Jan Klemens, yān klā'mēnz brān'nik'skē, Polish statesman: b. 1688; d. 9 Oct. 1771. In his youth he served in the French army. In 1715 he returned to Poland. He rose to the highest dignities, was an opponent of Augustus II., and the zealous champion of the nobility. After the death of Augustus III., he officiated as great constable and first senator of the kingdom, and stood at the head of the Republican party, but defended the privileges of the nobility. He was offered the crown by a great majority of the nobles who constituted the nation. But the party of the Czartoryskis, backed by Russia, was triumphant. Poniatowski was elected, and Branicki was outlawed and escaped to Hungary. As his wife was a sister of the new king, he soon returned and recovered his dignities. He was called by the nation the last patriot, and at his funeral was performed for the last time the mediæval ceremony of the ancient chivalry, that of breaking the coat of arms, and entombing it with the body of the last member of a noble line.

Brank, an instrument formerly in use for the punishment of scolds. It consisted of an iron frame which went over the head of the offender like a common horse-bridle, and had in front an iron plate, which was inserted in the mouth, where it was fixed above the tongue and kept it perfectly quiet. Such instruments are still preserved in the Ashmolean Museum, Oxford, the National Museum of Antiquities at Edinburgh, and in other museums, municipal buildings, and churches in England and Scotland.

Bran'nan, John Milton, American soldier: b. Washington, D. C., 1819; d. New York, 17 Dec. 1892. He graduated at the United States Military Academy in 1841, and entered the 1st Artillery. During the Mexican war he took part in the battles of Cerro Gordo, Contreras, and Churubusco, and in the siege of Vera Cruz and the capture of the city of Mexico, where he was severely wounded. He was brevetted captain for gallant and meritorious conduct at Contreras and Churubusco. He served against the hostile Seminoles in Florida, and at the outbreak of the Civil War commanded the forces engaged in the reduction of the Confederate works on St. John's River, compelling the evacuation of Jacksonville. He commanded a

division in the Army of the Cumberland 1863-4, taking part in the advance on Tullahoma, served through the Atlanta campaign and all its operations, and was in the battles of Hoover's Gap, Chickamauga, Missionary Ridge, Kenesaw Mountain, and the siege of Atlanta. On 13 March 1865 he was brevetted major-general of volunteers for gallant and meritorious services during the War. He was stationed at various posts from 1866 until his retirement, 19 April 1882, as colonel of the 4th Artillery.

Bran'ner, John Caspar, American geologist: b. New Market, Tenn., 4 July 1850. He graduated at Cornell University in 1882, and in 1885 took his degree of Ph.D. at the University of Indiana. He was assistant geologist of the Imperial Geological Survey of Brazil 1875-8; special botanist for Thomas A. Edison in South America 1880-1; special agent of the United States Department of Agriculture for investigating cotton and the insects affecting it in Brazil 1882-3; topographical geologist of the Pennsylvania geological survey, anthracite district 1883-5; professor of geology at the University of Indiana 1885-91; State geologist of Arkansas 1887-92. In 1892 he was elected professor of geology at Leland Stanford Jr. University, and since 1899 has been its vice-president. He has written a large number of papers and reports on geology and physical geography, and is associate editor of the 'Journal of Geology.'

Brannon, Henry, American jurist: b. Winchester, Va., 26 Nov. 1837. He studied law and practised his profession in West Virginia 1859-81, becoming circuit judge in 1880, and judge of the State supreme court in 1888. He has published 'Treatise On Rights and Privileges Under 14th Amendment to the Constitution of the United States.'

Brant, Joseph (THAYENDANEGBA), Mohawk chief: b. Ohio, about 1742; d. 24 Nov. 1807. He was sent by Sir William Johnson to a school at Lebanon, Conn., from which grew Dartmouth College. Joining the Episcopal Church he taught religion to the Mohawk Indians, translating into their language parts of the New Testament and the Prayer Book. His services against Pontiac and in the French and Indian war were highly valued. After Sir William Johnson's death, he became, in 1774, secretary to George Johnson, superintendent of Indian affairs, and when the American Revolution began he incited the Indians against the colonies. His presence at the massacre of Wyoming is authoritatively disproved, but he took part in that of Cherry Valley, and in other savage engagements. He was received with great distinction on his tour to England in 1786, and was attached to the military service of Sir Guy Carleton in Canada. He opposed the confederation of the Indians which led to the expedition of Gen. Wayne, and did all he could to prevent peace between the Indians and the United States. He was zealously devoted to the welfare of his own people, a brave warrior, and noted for his ability. In England he collected funds with which he built the first Episcopal Church in Upper Canada. One of his sons, in the War of 1812, was the leader of a body of Canadians and Indians against the United States. The life of Brant has been written by Col. W. L. Stone of New York.

BRANT — BRASENOSE

Brant, bränt, or Brandt, Sebastian, German poet: b. Strassburg, 1458; d. there, 10 May 1521. He studied law at Basel, took the doctor's degree, and delivered lectures on jurisprudence for many years. In 1501 he was state councilor at Strassburg, and state recorder in 1503. Some of his writings brought him to the notice of Emperor Maximilian, who entrusted him with several important commissions in the interests of the state. He translated Virgil, Terence, and other Latin writers, and wrote a number of law treatises as well as poetry. The work which brought him fame is a poem called 'The Ship of Fools,' first published in Basel 1494, in which he satirizes the vices and follies of his age. This became immediately popular; four editions appeared in one year, and it was translated into Low German, Latin, French, and English. In Germany it was so esteemed that the celebrated preacher Geiler of Kaisersburg delivered public lectures on it from the pulpit at Strassburg. Later editions have been printed, of which the best are by Zarneke (1854), and by Goedecke (1872). The English translations are by Alexander Barclay (1509), and by Henry Watson, the latter reprinted in 1874.

Brant, a small wild goose of the genus *Branta*. The most familiar species, the "common brant" (*Branta bernicla*) is found widely distributed throughout the United States. Its plumage, chin, and cheeks are glossy black, fading into gray at the sides, with its under parts entirely white, and white streaks on the sides of the neck. In its markings it is distinguished from the "black brant" (*Branta nigricans*) of the Pacific coast, which is entirely black underneath. Brants generally travel in flocks, and their comparative sluggishness enables the gunner to procure a larger number in the short time they are present, than of any other sort of goose. They feed on vegetable matter, their chief food consisting of the "eel-grass," for which they dive at low tide. The brant is chiefly a marine bird, rarely seen in the interior of the United States, and breeds in the far North, well within the Arctic Circle. Its nest is made on the ground from grass, mosses, etc., and its four eggs are dirty white in color. The name is sometimes given to other species of goose, as for instance the "snow goose" (q.v.) is sometimes termed "white brant" because of its similarity in size. See Goose.

Brant-bird, or Beach-robin, common names among American gunners for the shore-bird (*Streptopelia interpres*), called "turnstone" by British sportsmen and in most books, because of its habit of moving aside pebbles in order to get at the beach-fleas and other small creatures hiding beneath them, upon which it feeds. It also makes a special food upon our shores of the eggs of the "horsefoot," or king crab, which it scratches out of the sand; hence it is known to some as "horsefoot snipe." It stands between the plovers and sandpipers, having a comparatively short bill and legs, and less active manners than most of the latter. It is, perhaps, the most beautiful of the beachbirds, having a highly variegated plumage much alike in both sexes. The bill is black; feet orange; head and sides of neck black and white, with a black band across the breast; throat, lower parts and tail coverts, white; remainder of the plumage chestnut and brown, mottled with black

and set off by a white band on the wing. This is one of the most cosmopolitan of birds, wandering to all parts of the world, yet nowhere, perhaps, numerous. It is solitary, and a rarity in the gunner's bag, but highly prized. It is migratory in the United States and Central Europe, going in summer to breeding places along the Arctic coasts, and in winter to the tropics.

Brant'ford, a city of Brant County, Ontario, Canada, named after Brant, the Mohawk chief; on the Grand River, and the Grand T. R.R., 70 miles east of London. The city is connected with Lake Erie by a canal which joins the river at a distance of about two miles. There are manufactures of metal and stoneware, engines, machinery, agricultural implements, etc., and the city has great railroad shops, several branch banks, and is the trade centre of a large agricultural region. Brantford is the seat of the Ontario Institution for the Education of the Blind and of Wickliffe Hall. The amalgamated tribes of the Six Nations have their headquarters here. Pop. (1901) 16,631.

Brantôme, Pierre de Bourdeille, pē-är dé boor-dā-ē bran-tôm, (LORD OF THE ABBEY OF BRANTÔME): b. Périgord, Gascony, about 1540; d. 1614. In his epitaph, composed by himself, he relates in a vaunting manner how he first bore arms under the great Francis of Guise, and afterward served the king, his master. At an early age he received the abbey of Brantôme, but his life was mostly spent in war and gallantry. After the death of Charles IX. he withdrew to his estates and wrote his memoirs, which have a great deal of vanity and self-complacency, mingled with much that is interesting. They are a living picture of his age; for Brantôme was personally acquainted with all the great characters of the time, and an eye-witness of all the important events which then took place, and in some was an actor. Brantôme's character was that of his native province and of his rank. He was a courtier, regardless of right or wrong; who does not blame the great, but observes and relates their faults and crimes as ingenuously as if he were uncertain whether they deserve praise or blame; as indifferent about honor and chastity in women as about integrity in men. He speaks of the good King Louis XI., who ordered his brother to be poisoned, and of the virtuous ladies whose adventures no pen but his own could describe. He places us in the middle of that century when expiring chivalry was contending with the forming and as yet unsettled manners of later times. Brantôme, in the midst of his wandering life, had acquired more learning than most of his fellow soldiers. He has left 'Vies des grands Capitaines Français'; 'Vies des grands Capitaines Etrangers'; 'Vies des Dames Illustres'; and 'Vies des Dames Galantes' (together named by the author 'Recueil des Dames'); besides other works.

Brase'nose, one of the colleges of Oxford University, founded by William Smith, bishop of Lincoln, and Sir Richard Sutton, in 1509. The origin of the name is unknown, farther than that it was transferred to the college from the previously existing Brasenose Hall. Anthony à Wood states that Brasenose Hall had as its sign a nose of brass, being probably a

knocker. The college is very rich in endowments, which, however, have suffered owing to the decreased revenue from land.

Brashear (brăsh'ēr) **City.** See MORGAN CITY.

Brash'er, Abraham, American army officer: b. New York, 22 Dec. 1734; died in exile during the revolution, in 1782. He was one of the most active associates of the "liberty boys" of his native city. He wrote many of the popular ballads of the revolutionary period, and was a constant contributor to the newspapers of his day. Among his poetical productions were 'Another New Year's Address,' and the 'General's Trips to Morristown,' both of which were favorites in the American camp.

Bras'idas, Spartan general who distinguished himself in the first half of the Peloponnesian war by his courage and his military skill: d. 422 B.C. After repelling the attack of the Athenians on the fortress of Methone (431 B.C.) he was elected by his fellow-countrymen to be the leader of an expedition intended for Thrace. The numerous colonies and allies of the Athenians in that part nearly all went over to the Spartans, after the arrival of Brasidas, and the former were obliged to despatch two armies to Thrace to oppose him. Cleon, the leader of the second army, allowed himself to be drawn into a battle at Amphipolis, and was totally defeated, he himself being in the number of the slain. But the Spartan victory was purchased with the loss of their general, who received a fatal wound during the engagement.

Brass, Sally, in Dickens' 'Old Curiosity Shop,' an evil and cruel woman who was her brother's law partner and assisted him in carrying out his schemes.

Brass, Sampson, in Dickens' 'Old Curiosity Shop,' an attorney of evil reputation, whom Quilp uses as a tool.

Brass. Copper, and zinc unite in several proportions, forming alloys of great importance in the arts. The best brass consists of two parts by weight of copper to one of zinc; and when the latter is in greater proportion, compounds are formed called tombac, Dutch gold, and pinchbeck. The advantages which lead to the extensive use of this alloy in the arts consist in its bright yellow color, its hardness, and the facility with which it is cast. On the other hand, ordinary British brass, composed as stated above, is not malleable when hot, and therefore all articles made from it must either be cast or turned. In order to remove this disadvantage, an alloy has been made differing from the ordinary British brass, by having a larger proportion of zinc, which has the effect of producing a compound combining all the valuable qualities of brass with the property of being malleable when hot. The proportions in this case are about three parts of copper to two of zinc. Brass is sometimes mixed with about 2 per cent of lead to enable it to be used more readily for work that requires to be turned or filed. The lead has the effect of hardening the brass, so that the turnings break short, and the tool is thus prevented from being clogged. In order to resist the action of the air on brass, it has to be covered with a coating of metal that is not so easily oxidized. The process is first to bring the brass to a clean face by repeated immersions in nitric

acid and then to cover it with an alcoholic solution of shellac. Generally more or less dragon's blood is added to the solution in order to vary the tint of the brass according to pleasure. Brass foil, also called Dutch leaf, and in German Rauschgold, is made by beating out sheets of very thin brass containing a large proportion of copper. By this process leaves may be obtained not more than one fifty thousandth of an inch in thickness. Brass is manufactured on a large scale, chiefly at Bristol and Birmingham in England, and at Holywell in North Wales. Brass was well known to the Romans under the name of orichalcum, who took advantage of its resemblance to gold in robbing the temples and other public places of that precious metal. Thus Julius Cæsar robbed the capitol of 3,000 pounds weight of gold, and Vitellius despoiled the temples of their gifts and ornaments, and replaced them with this inferior compound.

Bras'sarts, or Brassards, jointed plates of steel, protecting the upper arm, from the shoulders, which were covered by poldrons, to the elbows, where they were met by the gauntlets. These pieces of armor were not used in the chivalric ages, or in full suits of knightly armor, but in the half armor worn during the wars of Gustavus Adolphus, Wallenstein, and the Low Countries, in the times of Cromwell, when plate armor was going out of use.

Brasses, Monumental or Sepulchral, plates of brass, or of a mixed metal resembling brass, called laton, or latten, used as memorials of the dead. They were often made of life size and were cut to the shape of the figure, the details of armor, costume, features, etc., being worked out in incised lines from an eighth to a quarter of an inch in depth. Others, again, are found of much smaller dimensions, and rectangular in form, bearing in miniature the effigies of several figures. Such a plate of the 16th century, in the abbey church of Whalley, Lancashire, England, shows in the middle foreground the effigy of a knight in plate armor, kneeling with his hands clasped as if in prayer, and opposite him, in a similar devotional attitude, that of his wife; while behind the father range the kneeling figures of several sons, distinguished by their costumes as soldiers, priests, etc., and behind the mother a similar row of daughters, the family numbering in all some 20 persons. Underneath is an inscription recording the names of the knight and his wife, with dates, and a statement that he had built the chantry in which the plate was placed. Such brasses are often found affixed to the walls of a church, but it is sometimes uncertain whether they were so placed originally, many plates having been removed in the course of restorations.

The larger outline figures are usually found riveted or leaded into slabs of stone which form part of the church floor, the shallow depressions which hold the plate being cut to the figure. Such an one is the brass of Sir Roger de Trumpington, in Trumpington Church, near Cambridge, England, here shown. It is an excellent and well-preserved delineation of the armor of its day. The date of death is 1289, and this is believed to be the second oldest monumental brass in England; the older example being that of Sir John d'Aubernoun, in the church of Stoke d'Aubernoun, Surrey, bearing date 1277. The

BRASSEUR DE BOURBOURG

earliest brass of which there is any record in England is that of Simon de Beauchamp, of about the beginning of the 13th century; but the figure is no longer in existence. The incised lines were sometimes filled in with a hard enamel, often of varying colors, though in most cases the enamel has disappeared. By the use of these colors it was possible to display the heraldic tinctures of the shield or tabard.



Brass of Sir Roger de Trumpington, Trumpington Church, Cambridge.

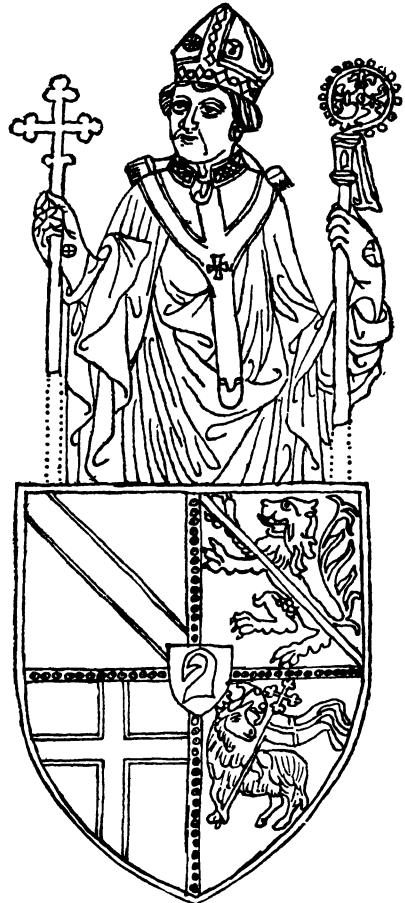
or those of soldiery reft them from their settings for purposes of gun-founding or revenge.

There are some handsome specimens of brasses mounted on altar-tombs. A fine instance is that of Robert Pursglove, suffragan bishop of Hull, England, in the chancel of St. Mary's Church, Tideswell, Derbyshire. The figure of the bishop is in full vestments, and a quaint inscription records his education by his uncle in Tideswell, and his subsequent career. It is a comparatively modern creation, however, of about the 16th or 17th century. A very handsome altar-tomb in the parish church of Skipton, Yorkshire, was designed by Sir Gilbert Scott,

after the more ancient models. On the top of the tomb are plates depicting a knight and lady of the Clifford family, and at the corners are the symbols of the four Evangelists. A brass fillet around the slab bears an inscription.

Some modern brasses are to be found, incised and enameled in colors with symbolic devices; but they lack the historic value and interest of the mediæval effigies, to which appeal has often been taken for the solution of some question of detail of costume, armor, or heraldry.

Information concerning monumental brasses may be found in Haines' 'Manual of Monumental Brasses'; The Oxford Architectural Society's 'Manual for the Study of Monumental Brasses'; Boutell's 'Monumental Brasses of England'; Waller's 'Series of Monumental Brasses from the 13th to the 16th Century'; Belcher's 'Kentish Brasses'; Creeney's 'Monumental Brasses on the Continent'; Gough's 'Sepulchral Monuments'; Cotman's 'Suffolk Brasses'; Dugdale's 'Monasticon Anglicanum';



Brass of an Ecclesiastic, Bonn, Germany.

English county histories; and the publications of the Royal Societies of Antiquaries and of Archaeologists.

ELFORD E. TREFFRY.

Brasseur de Bourbourg, Charles Etienne, shārl ā-tē-ën bra-sēr de boor-boor, French writer on American history, archaeology, and

BRASSEY — BRAURONIA

ethnology: b. 1814; d. 1874. He entered the priesthood, was sent to North America by the Propaganda, and lived and traveled here and in Central America for a number of years, partly in the performance of ecclesiastical functions. Among his works are 'Histoire du Canada'; 'Histoire des Nations civilisées du Mexique et de l'Amérique Centrale'; 'Gramatica de la Lengua Quiche'; 'Monuments anciens du Mexique'; 'Etudes sur le Système graphique et la Langue des Mayas.'

Bras'sey, Lady Anne, English descriptive writer: b. London, about 1840; d. 14 Sept. 1887. After her marriage she spent half of her life at sea on Lord Brassey's yacht, the *Sunbeam*. Her travels are interesting, popular, and have passed through many editions. They are 'Natural History of a Voyage on the Sunbeam'; 'Sunshine and Storm in the East'; 'Tahiti'; 'In the Trades, the Tropics, and the Roaring Forties,' and 'Three Voyages in the Sunbeam.'

Brassey, Thomas, English engineer and railroad contractor: b. Baerton, Cheshire, 7 Nov. 1805; d. Hastings, 8 Dec. 1870. After receiving an ordinary education he was, at the age of 16 years, apprenticed to a surveyor, whom he succeeded in business. After building parts of the Grand Junction and the London and Southampton railways, he contracted, in 1840, in partnership with another, to build the railway from Paris to Rouen. In a few years he held under contract, in England and France, some 10 railways, involving a capital of \$180,000,000, and employing 75,000 men. In partnership with Betts and Peto he undertook the Grand Trunk of Canada, 1,100 miles in length, including the great bridge at Montreal. His army of men were employed in nearly every part of Europe, South America, Australia, India, etc. He amassed great wealth, but continued to be generous to the needy, and modest and simple in his tastes and manners. Sir Arthur Helps wrote his 'Life' (1872).

Brassey, Sir Thomas, English politician, first Baron Brassey, son of Thomas Brassey (q.v.): b. Stafford, 11 Feb. 1836. He was educated at Rugby and University College, Oxford, and entered Parliament for Devonshire in 1865, subsequently sitting for Hastings 1868-86. He served as civil lord of the admiralty 1880-4, and was secretary to the admiralty in 1884-5. In 1886 he was elevated to the peerage as Baron Brassey. From 1895 to 1900 he was governor of Victoria. He has published 'Work and Wages' (1872); 'The British Navy' (1882-3); 'Lectures on the Labor Question' (1878).

Bras'sica, the generic name of cabbage, kale, mustard, cauliflower, etc. (q.v.).

Brassy, a fish. See **POUR**.

Brattleboro, brăt't'l-bür-ō, Vt., a town in Windham County, on the Connecticut River, and the Boston & M. and the Central V. R.R.'s; 11 miles southeast of Newfane, the county-seat. It is in a picturesque farming region; is the trade center of southeast Vermont; and contains the State Asylum for the Insane, Brooks Public Library, Glenwood Academy, and manufactures of organs, carriages, furniture, and machinery. Brattleboro is the center of the maple sugar

industry of Vermont, and has two national banks and several weekly and monthly periodicals. Pop. (1900) 5,297.

Braun, August Emil, ow'goost ā'mēl brown, German archæologist and writer on art: b. Gotha, 19 Aug. 1809; d. 12 Sept. 1856. He received his early education at his native town, and continued his studies at Göttingen. From 1832 to 1833 he resided at Dresden, whence he went to Rome in company with Gerhard, with whom he had formed a close intimacy. In the same year he was appointed first librarian and then assistant secretary to the Archæological Institute, and in 1834 became editor of the 'Bulletino,' and in 1837 of the 'Annali' of that institution. His chief works are: 'The Judgment of Paris'; 'The Artistic Representations of the Winged Bacchus'; 'Ancient Works in Marble' 1st and 2d decades; 'The Greek Doctrine of the Gods'; 'The School of Art Mythology,' with 100 copperplate engravings, translated into English by Grant; 'The Ruins and Museums of Rome,' constituting an excellent guide-book for artists and antiquaries.

Braun, Kaspar, German wood-engraver: b. Aschaffenburg, 1807; d. Munich, 29 Oct. 1877. He studied engraving in Munich and in Paris under Brévière. In Munich he founded, with Dessauer a xylographic institute, which later became a school of engraving. In 1843 he, in association with Friedrich Schneider, founded the 'Fliegende Blätter.' The chief works which Braun has illustrated are 'Die Nibelungenlied'; the 'Volkskalendar'; 'Götz von Berlichingen'; and 'Münchner Bilderbogen.'

Braun, Ludwig, German painter: b. Schwäbisch Hall, 23 Sept. 1836. He was educated at Munich and Paris, and a number of water colors of the Schleswig-Holstein war were the means of obtaining him a contract to paint a cycle of pictures illustrating the history of the family of the Count of Hünolstein. His favorite subjects are battle scenes, and he accompanied the Austrian army in the Danish war and the Germans in the Franco-Prussian war. Among his works are 'The Capitulation of Sedan'; 'The Entry of the German Army Into Paris'; and 'The Germans in Versailles.' He has also painted several very successful panoramas, including 'The Battle of Sedan'; 'The Battle of Mars-la-Tour'; and the 'Battle of Lützen.'

Braunsberg, browns'bĕrk, Prussia, a town in the province of eastern Prussia, and government of Königsberg, on the Passarge, about four miles from its junction with the Frische Haff, divided by the river into the old and new towns. It is the residence of the bishop of Ermeland, and the seat of a royal court of justice; contains four Roman Catholic churches and one Protestant church; a Roman Catholic Lyceum, with theological and philosophical faculties; a gymnasium, and seminary for priests, with six professors; a normal school, an asylum, and three hospitals. It has some linen and woolen manufactures, and tanneries; and a considerable trade in yarns, grain, and ship-timber, the river being navigable for small vessels as far as the town. Pop. (1903) 13,000.

Brauro'nia, (1) a name sometimes given to the Greek goddess, Artemis, from her shrine at Brauron, Attica; (2) a Greek festival in

honor of Artemis held every four years at Brauron, in which every Attic woman must take part before she could marry. The rites were performed by girls from 5 to 10 years old, and a part of the ceremony consisted in their imitation of the actions of bears.

Brauwer, brow'ér, or **Brouwer**, **Adrian**, Dutch painter: b. Haarlem, or Oudenarde in East Flanders, 1608; d. Antwerp, 1640. He made designs of flowers and birds, which were stitched upon caps and bonnets sold by his mother, a poor woman, to the peasants. Francis Hals, a distinguished painter of Haarlem, happening to see some of these, was so struck by the talent which they evinced that he invited the young artist to receive instructions at his house, where he kept him hard at work in a garret, and appropriated to himself the proceeds of his pictures. Here Brauwer remained for many months, ignorant of the estimation in which his talent was held abroad, until by the assistance of his fellow pupil, Adrian van Ostade, he was enabled to escape to Amsterdam. The discovery of the reputation he had acquired seems to have crushed rather than incited his ambition. Perceiving the prices which his pictures commanded, and his own facility in executing them, he yielded to a natural taste for gross pleasures, and painted only when it was necessary to procure money to indulge in dissipations. During the wars with Spain he started on a journey to Antwerp, but being unprovided with a passport he was imprisoned on suspicion of being a spy. The Duke d'Arenberg, a fellow prisoner, recognizing his talent, induced him to paint something. The subject was a group of soldiers playing at cards, which the artist sketched from his prison window, and the picture being shown to Rubens he at once pronounced it a work of Brauwer, whose release he immediately procured, and whom, from admiration of his genius, he received as an inmate into his house. Brauwer's longing for his old life, however, soon induced him to leave his protector, and after a brief career of reckless dissipation he died in the public hospital of Antwerp.

Bravi, brä've, the name formerly given in Italy, and particularly in Venice, to those who were ready to hire themselves out to perform any desperate undertaking. The word had the same signification in Spain, and both the word and the persons designated by it were found in France in the reign of Louis XIII. and during the minority of Louis XIV. At the end of the 15th century they are described as being armed to the teeth, with an arquebuse in their hands, a cutlass at their side, masked by a bushy beard and enormous moustaches, and wearing a long and thick forelock called a *ciuffo*, which they used to bring down over their face when they wished to conceal it entirely.

Bravo, **Leonardo**, lä-ō-när'dō brä'vō, Mexican revolutionary patriot: b. near San Luis de Potosi, 1766; enlisted in the revolutionary cause, and died of prison fever, in the hands of the Spaniards, in the city of Mexico, in 1812. The Spanish commander had repeatedly offered him his liberty on condition of taking service in the royal army, but, though the fever caused by confinement in a filthy dungeon was wearing out his life, he steadily refused to save it on such conditions.

Bravo, brä'vō, **Nicholas**, Mexican statesman, son of Leonardo Bravo: b. Chilpanzingo, 1790; d. 22 April 1854. He participated in the revolution against Spain (1810-17), and later aided Iturbide in establishing a republic, and supported him until 18 May 1822, when Iturbide proclaimed himself emperor. To this step Bravo was opposed, and he contributed in no small degree to Iturbide's deposition. He again became a member of the provisional government which remained from 1 April 1822 till 10 Oct. 1824, when the federal constitution took effect, under which he was elected to be vice-president until 1 April 1829, Guadalupe Victoria being president. The politics of Mexico had now become involved in a controversy in which the order of freemasons, divided into two parties, one known as the *Escoscs* and the other as *Yorkinos*, contended at once for the Scotch and ancient York rituals, and the one for a centralized, and the other for a federal, form of government. Bravo was grand master of the Scotch division, and when the federal system prevailed he became a leader of the opposition. Notwithstanding this, he had been elected vice-president; but when, on 23 Dec. 1827, the standard of revolt was raised at Otaviba, he became the head of the movement. The purpose of the *pronunciamiento* was to replace the actual members of the executive government with men of the *Escoscs*, and to dismiss Mr. Poinsett, then United States minister in Mexico, who was charged with too actively favoring the other party. Bravo was defeated and expelled, but was recalled in 1830 by President Bustamente, and sent by him against the insurgent Guerrero, who was taken in arms and executed by Bravo's orders, 14 Feb. 1833. After this Bravo remained in retirement until July 1839, when, as president of the council, he was charged with the supreme administration of the government during an interim of a week. Again from 26 Oct. 1842, till March 1843, he was substituted as president by Santa Anna, during his absence as dictator at the head of the army. For the last time he held executive power as temporary president from 29 July to 4 Aug. 1846, when he was deposed by a revolution. On the commencement of the war between Mexico and the United States, he took up arms in behalf of his country, and participated in the battle of Cerro Gordo. In the autumn of 1853 he was accused by the ministers of Santa Anna of having secretly joined Juan Alvarez in the insurrection he had set on foot; but he at once denied the accusation and declared that he had retired from public life forever.

Bra'vo, **The**, a novel by James Fenimore Cooper, is a tale of Venice in the 16th century, full of mystery and intrigue, and the high-sounding language which years ago was thought the natural utterance of romance. Don Camillo Monforte, a Paduan noble, has a right by inheritance to a place in the Venetian Senate. He becomes obnoxious to the Council, and a bravo is set on his track to kill him. He has fallen in love with Violetta, a young orphan heiress designed for the son of an important senator; and she consents to elope with him. A priest marries them, but by a trick she is separated from him and carried off. The Bravo, sick of his horrible trade, has refused to take a hand in the kidnapping of Violetta; and confesses to Don Camillo all he knows of it, promising to help

him recover his bride. Jacopo, the Bravo, finds her in prison and contrives her escape to her husband; but is himself denounced to the Council of Three, and pays for his treachery to them with his head. The romance is of an antiquated fashion; and has not the genuineness and personal force of Cooper's sea stories and 'Leatherstocking Tales,' which grew out of an honest love for his subjects.

Bravo-Murillo, Don Juan, dōn hoo-ān' brä'vō-moo-rē'lyō, Spanish statesman: b. Badajoz, June 1803; d. Madrid, 11 Jan. 1873. In 1825, he entered the College of Advocates at Seville, and showed great devotion to the monarchy. When the Progressistas came into power he went to Madrid, and founded a law magazine, the 'Boletín de Jurisprudencia.' In 1836, he became secretary of the Department of Justice under Señor Isturiz. In 1847 he became minister of Trade and Public Instruction, and, in 1849-50, of Finance. In 1851 he formed a cabinet, with himself as premier, but, in 1853, it was superseded by that of Gen. Lersundi. The oppressive measures adopted by Bravo-Murillo and his successors led to the revolution of 1854, and the attainment to power of Marshals Espartero and O'Donnell.

Bravura (bra-voo'ra) **Air**, an air so composed as to enable the singer to show her skill in execution by the addition of embellishments, striking cadences, etc. It is sometimes used for the style of execution.

Brax'ton, Carter, signer of the Declaration of Independence: b. Newington, King and Queen County, Virginia, 10 Sept. 1736; d. 10 Oct. 1797. He inherited several plantations, and passed the early part of his life in the enjoyment of his fortune in his native State, and in England, where he resided some years. In 1765 he took an active part in the eventful session of the house of burgesses of Virginia, in which the resolutions of Patrick Henry were adopted, and in the subsequent assemblies which were dissolved by the governor. He was next a member of the conventions which were the first step toward the substitution of popular for the royal government; and on 15 Dec. 1775, was elected delegate to the continental congress, as successor of Peyton Randolph, and as such affixed his name to the Declaration of Independence. He did not remain long in Congress, but served in the legislature of Virginia until 1786, when he became one of the executive council. The close of his life was embittered by pecuniary embarrassments, and the entire wreck of his fortune.

Brax'y, or Dysentery in Sheep, inflammation of the coats of the intestines. It is often preceded by diarrhoea, and attended by fever and constitutional disturbances. A sudden change of pasturage, more particularly from a succulent to a high and dry pasture, is one of the most frequent causes, and to this may be added exposure to wet and cold after traveling. It is a much more serious disease than simple diarrhoea, and often becomes fatal in the course of a few days. The name is also applied to a blood disease resulting from plethora, which is considered by some to be the true braxy. In this case also a sudden change of pasturage is the most frequent cause of the disease, but the change which generally produces it is the reverse of that which produces the

former, namely, a change from a low diet to rich and nourishing food. This disease is even more fatal than the former, and runs its course in a few hours. As there is no means of saving an animal which is once attacked, the only course is to avoid the causes which lead to the disease.

Bray, Anna Eliza, English woman of letters: b. London, 25 Dec. 1790; d. there, 21 Jan. 1883. Her maiden name was Kempe; she studied for the stage, but in 1818 was married to Charles A. Stothard, son of the famous artist, and, after his death, became the wife of the Rev. Edward A. Bray, vicar of Tavistock. From 1826 to 1874 she wrote a series of novels, one of which, 'The Talba, or the Moor of Portugal,' brought her the acquaintance of Southey. In 1884 they were collected in a 12-volume edition. She wrote the 'Life of Thomas Stothard' (1856), and many books of travels. Her letters addressed to Southey, on the superstitions and scenery of Tavistock, entitled 'The Borders of the Tamar and the Tavy' (1836; new ed. 1879), and 'A Peep at the Pixies; or, Legends of the West' (1854), are much esteemed. Mrs. Bray's 'Autobiography' appeared in 1884.

Bray, Sir Reginald, English architect: d. 1503. He was the second son of Sir Richard Bray, one of Henry VI.'s privy councilors, and stood high in the favor of Henry VII., for whom he is understood to have designed, if he did not actually execute, the beautiful chapel at Westminster which bears that monarch's name. Another of his works, and now his final resting-place, is the almost equally beautiful chapel of Saint George's at Windsor.

Bray, Thomas, English clergyman: b. Marton, Shropshire, 1656; d. London, 15 Feb. 1730. Having entered the ministry of the Established Church he founded in 1698 the Society for Promoting Christian Knowledge and in 1700 organized the Anglican Church in Maryland. In the following year he secured a charter for the Society for the Propagation of the Gospel in Foreign Parts. He was rector of Saint Botolph's, Aldgate, London, from 1706. He devised a system of lending libraries for parish purposes and in 1723 established the still existing society of Associates of Dr. Bray, which carries on his benevolent undertakings. He published a 'Directorium Missionarium' (1726); 'An Essay Toward Promoting All Necessary and Useful Knowledge' (1697), and several lesser works.

Bray, The Vicar of (SIMON ALEYN), incumbent of a small English parish near Maidenhead, Berkshire, from 1540 to 1588, during the reigns of Henry VIII., Edward VI., Mary, and Elizabeth. He kept his vicarage by changing his faith according to that of the state for the time being, becoming a Protestant with Henry, Catholic again in the reign of Mary, and Protestant again on the accession of Elizabeth. His principle was to live and die Vicar of Bray, and to it he adhered. The modern ballad, 'In Good King Charles' Golden Days,' makes the versatile vicar live in the reigns of Charles II., James II., William III., Anne, and George I. The parish is 23 miles west of London and has a population of 5,750.

Bray, a maritime town of Ireland, partly in county Dublin and partly in Wicklow, though

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mainly in the latter, picturesquely situated on both banks of the Bray, which here forms the boundaries of these two counties, 12 miles southeast of Dublin. The town, which has been popularly designated "the Irish Brighton," has been much improved in recent years, new houses being built, and a broad esplanade formed. Pop. (1901) 7,000.

Brayera, also known as *Cusso* or *Kouso*, a handsome ornamental tree of Abyssinia belonging to the rose family. Its scientific name is *Hagenia Abyssinica*. The leaflets number 6 to 12 to each leaf, and its stamens are in separate flowers from its pistils. The bunches of pistillate flowers, made into an infusion, are used in medicine for the expulsion of worms, especially the tape worm. The taste is bitter and unpleasant. The active principle is kosin, which is sometimes given by itself.

Brayman, Mason, American soldier and lawyer: b. Buffalo, N. Y., 1813; d. 1895. He learned the printer's trade in early life, but took up the study of law and was admitted to the bar in 1836. Removing to Illinois he was employed by that State to settle the difficulties with the Mormons of Nauvoo, and secured their removal in 1844. He served in the Federal army during the Civil War, and at its close was brevetted major-general. He was territorial governor of Idaho 1876-81, and after the last named date practised his profession at Ripon, Wis., until his death.

Brazen Sea, the copper basin or vase which King Solomon placed in the priest's court for the uses of the servitors. It was 5 cubits high and 30 in circumference, and was supported on 12 oxen facing outward. It seems probable that its original purpose was symbolical rather than practical. King Ahaz removed it to a stone pedestal and it was finally destroyed by the Chaldeans, who carried off the copper to Babylon.

Brazen Serpent, a bronze or copper figure which Moses is said to have made and set up before the Israelites for the healing of all who had been bitten by venomous serpents. As this was subsequently superstitiously adored by the Israelites it was destroyed by King Hezekiah. Among the Phenicians the serpent was regarded as the symbol of the god of healing.

Brazil (The United States of Brazil), a republic bordering upon all of the South American countries except Chile, shares to a greater or less extent the natural resources and physical characteristics of each. But even more than its neighbors it requires, for the development of these resources on an adequate scale throughout its length (2,500 miles), and breadth (4,000 miles), both immigration and new industrial enterprises. The central fact concerning the vast Amazon region, stretching across the continent from a few degrees north to about 16° south of the equator, is that its rank vegetation defies the efforts of casual settlers, and nothing less than a teeming population could properly subdue it to human uses. The total area of Brazil, according to the most recent computation, is 3,218,130 square miles; and this includes the largest compact body of fertile and habitable territory that yet remains unimproved, and even, in part, unexplored. Nearly the entire population of the republic is still found on a com-

paratively narrow strip of land extending southward along the Atlantic coast from Pará, below the mouth of the Amazon, to the line of Uruguay. In other words, the white people have clung to the fringe of the continent which their ancestors took possession of in the 16th century in the fashion we shall presently describe; and no civilizing conquest and occupation of the interior, such as occurred in North America, have been effectively undertaken. Except along or comparatively near the coast, the Brazilian states have less than one inhabitant per square mile. The number of inhabitants in the entire country was estimated at 21,565,000 in 1900, distributed as follows among the 20 states of the republic, and including 750,000 for the federal district:

State	Population	State	Population
Minas Geraes....	4,277,000	Para	652,000
Bahia	3,335,000	Parahyba	596,000
San Paulo.....	2,520,000	Sergipe	450,000
Pernambuco	2,089,000	Piauhý	425,000
Rio Grande do Sul	1,350,000	Rio Grande Norte	407,000
Rio de Janeiro..	1,300,000	Santa Catharina..	405,000
Ceara	1,000,000	Parana	380,000
Alagoas	781,000	Goyaz	340,000
Maranhao	660,000	Amazonas	240,000
		Espírito Santo....	201,000
		Matto Grosso....	157,000

There were 2,705,000 foreigners in Brazil, namely, Italians, 1,300,000; Portuguese, 800,000; Germans, 300,000; Spanish, 100,000; Poles, 80,000; French, 10,000; English, 5,000; North Americans, 500; other nationalities, 110,000.

Comparing the above figures with those given a decade earlier, we conclude that the estimate for 1900 is probably too high. The total population in 1890, including 600,000 uncivilized Indians, was stated to be only 14,333,915.

History.—Brazil was discovered in 1499 by a companion of Columbus, Vicente Pinzon, who made no settlement, and, indeed, would not have been justified in doing so. The bull of Pope Alexander VI. (4 May 1493) had bestowed upon Portugal the lands which should be found east of the line of demarcation, and commissioners of Spain and Portugal had agreed, on 7 June 1494, that the position of the line of demarcation should be changed so that it should pass, north and south, 370 leagues west of the Cape Verde Islands, instead of at a distance of only 100 leagues west of those islands, where the Pope had established it. Accordingly Spain was precluded by her own act from claiming the eastern portion of the continent of South America. A Portuguese commander, Pedro Alvarez Cabral, when on his way around the Cape of Good Hope to the Far East, in 1500, encountered severe storms which drove his vessels from their course; and through this mischance he reached the Brazilian coast in April. Mass was celebrated there on Easter Day; the country was declared a dependency of Portugal, and a stone cross was erected. There Cabral himself embarked for India, but first sent a vessel to Lisbon with a report of this important discovery. As soon as practicable after receiving the account of his new possession, Dom Manuel placed three vessels under the command of Amerigo Vespucci, instructing this Florentine to make good Portugal's claim to the land which a Spaniard had discovered. Thus, from the beginning, Brazil was marked out as a field for international competition. Vespucci's first voyage being unsuccessful, a second was undertaken

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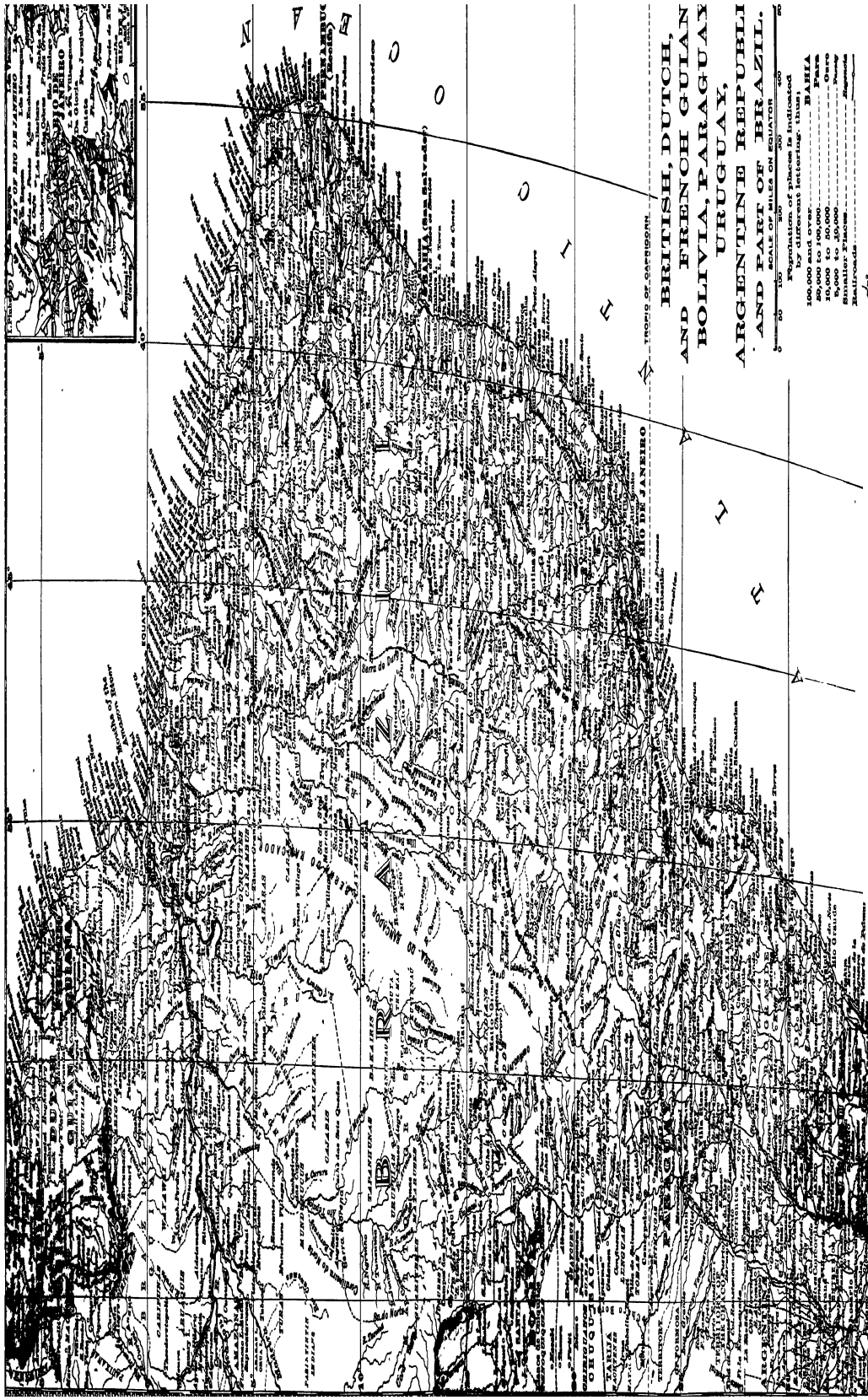
with better results. He remained for five months at a point he named "All Saints," and when it became necessary to return left 12 men as a garrison in a small fort. The impression created by the experiences of the early adventurers was not highly favorable. Poor and unattractive, indeed, did this land seem in comparison with India and Africa. During the years that followed Portuguese merchants dispatched vessels to trade for Brazil-wood, and the Portuguese government jealously resisted French and Spanish attempts to gain a foothold or carry on commerce eastward of the line of demarcation; but the court at Lisbon continued to prefer the profits to be won along the course that Vasco da Gama had opened up. The first settlements, therefore, were not made by the government, but by grantees whom the government induced to colonize by assigning to each leader a splendid possession, or "captaincy"—no less than 50 leagues of coast, with feudal powers and the privilege of extending his domain as far inland as he desired. Thus the province of San Paulo was settled by an expedition under Piratininga; next Affonso de Sousa explored the coast from Rio de Janeiro (so called because it was discovered 1 Jan. 1531) to the Rio de la Plata. Lopes de Sousa received two allotments of 25 leagues each, one being near Pernambuco and Paraiba. Fernandez Coutinho and Pedro da Campo Tourinho established themselves near the spot where Cabral landed. Francisco Pereiro Coutinho received a grant of a captaincy, extending from Rio San Francisco to Bahia. The captaincy of Pernambuco was given to Duarte Coelho Pereira; and so the most attractive portions of the coast were distributed. Cattle and sugar-cane being introduced from Madeira, the systematic cultivation of the latter began; though some authorities maintain that both sugar-cane and coffee are indigenous to Brazilian soil. Enormous difficulties were encountered from the first by proprietors and planters. Only men of large means (including some of those adventurers who had amassed fortunes in India), were able to equip and maintain such a considerable force as was necessary if these undertakings were to be successful. The natives were, as a rule, extremely mistrustful, besides being the most savage of their kind, as Southey has shown in his elaborate description of them. ('History of Brazil,' by Robert Southey, 1810). Cannibalism was universally practised. In general, the nature of these Indians appears to have been far more debased, and their practices more revolting than the nature and customs of the Red Men of North America; the task of civilizing them seemed more utterly hopeless. Yet one striking exception to the general experience may be noted. The first settler in Bahia was Diogo Alvarez, a young man of noble family, who was wrecked on the shoals near that port. "Part of the crew," says Southey, "were lost, others were eaten by the natives." Diogo secured the favor of the Indians by recovering things from the wreck. Afterward he led them in battle, using his musket to such good effect that he became their sovereign, and took daughters of the chiefs of the savages to be his wives. "The best families in Bahia," we are told, "trace their origin to him."

By the middle of the 16th century the captaincies of those men whose names have been mentioned, and still other adventurers, were

scattered along the coast from the mouth of the Amazon to the mouth of the Rio de la Plata. The great mineral wealth of the country had not been discovered at that time, and the settlements were chiefly devoted to the cultivation of sugar. What with savages surrounding these widely separated posts; Spaniards threatening them from the rear (the Spanish troops then holding the regions afterward to be known as Paraguay and Argentina); and the French from time to time attempting to establish themselves on the coast; it was found necessary to provide for the common defense by concentrating the Portuguese power in the hands of a governor-general. The feudatories had to submit to the revocation of some of their privileges, though they remained on the soil which they owned.

The first governor-general was Trome da Sousa, and his capital was Bahia. In 1549 he was reinforced by a fleet of six vessels with 320 soldiers and officials, 400 convicts, 300 free colonists, and 6 Jesuits. At different times wards of the Crown, female orphans of good family, were sent out, provided with portions from the royal estates, and given to the provincial officers in marriage. The establishment of the College of San Paulo in Piratininga followed hard upon the arrival of the first bishop of Brazil in 1552, and of a number of Jesuits in 1553. Avowed friends and protectors of the natives, these members of the Society of Jesus took upon themselves the pioneers' task, and their college became a centre of influence. Intrusive French settlers at Rio de Janeiro were driven out by the governor, and a Portuguese colony was founded there in 1567. But the progress of Brazil, in so far as it was dependent upon the aid of the mother country, was checked, if not entirely arrested, during a period of 60 years. Philip II. of Spain acquired the crown of Portugal in 1578-80, and the union of the two countries—or rather, the subordination of the weaker nation—continued until 1640. Brazil received little attention during all these years, in part because she was identified with Portugal, but still more for the reason that her inferiority to the Spanish possessions in mineral wealth was taken for granted. The transfer of allegiance invited attack by English fleets. In 1586 Witherington sacked Bahia; Cavendish, in 1591, burned San Vicente; Lancaster, in 1595, captured Olinda. A futile attempt to found a permanent colony was made by the French (1612-18), and the Dutch dispatched a fleet against Bahia in 1624.

The Dutch in Brazil.—Most important were the efforts made at this time by an association of Dutch merchants, the famous Dutch West India Co., which commissioned Count Maurice of Nassau to promote the interests of his countrymen in South America. The enormous power of this corporate company, which, as Bancroft says, was "given leave to appropriate continents," and, when "invested with a boundless liberty of choice, culled the rich territories of Guiana, Brazil, and New Netherland," was exerted in a large part of the region lying between Maranhão and Bahia. After the revolution of 1640, Brazil was, indeed, no longer Spanish, but the new Portuguese executive of the house of Bragança was too poor and weak to adopt such vigorous measures as were required. Accordingly a suggestion offered by a native of Madeira named Vieyra was welcomed, inasmuch as this plan re-



BRITISH, DUTCH,
AND FRENCH GUIANA
BOLIVIA, PARAGUAY,
URUGUAY,
ARGENTINE REPUBLIC,
AND PART OF BRAZIL.

SCALE OF MILES ON EQUATOR

100,000 feet over
80,000 to 100,000
60,000 to 80,000
40,000 to 60,000
20,000 to 40,000
Below 20,000
Distances
by different latitudes, times

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lieved the government of the obligation to fight the Dutch West India Co. Vieyra proposed the establishment of a commercial company at Lisbon similar to that which had its headquarters at Amsterdam. The Brazil Co. of Portugal was organized, and in 1649 sent out its first fleet. After five years of severe fighting, the Portuguese merchants overcame the Dutch merchants.

For half a century Brazil was permitted to remain at peace. In 1710, however, a French squadron under Duclerc attacked Rio de Janeiro and suffered defeat. On 12 September of the following year Admiral Duguay Trouin arrived off Rio with a new fleet and 6,000 men. The governor was compelled to capitulate and to pay a large sum of money. A great change in the industrial conditions of the southern districts was produced by the discovery of diamonds at this time (1710-30), and by the rush to the gold regions opened up by the enterprise of the colonists of San Paulo—a hardy race, doubtless with a large admixture of Indian blood, much addicted to adventurous raids into the interior. Their explorations extended westward into Paraguay and northward into Minas, Goyaz, and Cuyabá in the state of Matto Grosso. Gold was discovered in the regions last mentioned; by the beginning of the 18th century there were five towns of considerable importance in Minas Geraes; and that state is now, as we have seen, the most populous of the republic. Laborers were withdrawn from the sugar industry by the superior attractions of mining, and Brazil lost her leading position as a sugar-producing country. The conspiracy of Minas in 1789 was the first sympathetic movement in Brazil occasioned by the Revolutionary War in North America. Inspired by the success of the English colonies in achieving independence, the inhabitants of Minas formed a project to throw off the Portuguese yoke, but the plot failed, the leader was hanged, and the conspirators were banished to Africa, from which continent slaves were being imported in large numbers. It was an unprofitable exchange for America. The French Revolution, among its extraordinary consequences, promoted Brazil from the humble position of a colony to be the seat of government of the Portuguese power, and the only American monarchy. In 1807 the threat of the invasion of Portugal by Napoleon sent the prince regent, afterward King John or Dom João VI., across the ocean (29 November). With him went the queen, the royal family, the great officers of state, and members of the nobility. He created many new offices, and otherwise made the machinery of government in Brazil much more elaborate than it had ever been; and, to meet the increased expenses that these changes involved, at first imposed new taxes, and afterward, by debasing the money standard, inaugurated the long period of financial error that has impeded the advancement of the country. On the other hand, Brazilian ports were declared open to the commerce of all nations at peace with Portugal. Thus John favored industrial development and injured it at the same time. Numbers of artisans and manufacturers from England, Germany, France, and Sweden came to take advantage of the new opportunity. In 1816 the School of Fine Arts was founded by French painters and sculptors. The occupation of Portugal by French troops was offset in

the new world by the incorporation of French Guiana with Brazil (1809); but the treaty of Vienna in 1815 restored Guiana to France. On 16 Jan 1815, the title of kingdom was conferred upon Brazil; and an important extension of the domain of this unique American monarchy was effected six years afterward, when Uruguay was united with it under the title of the Cisplatine State. But this union, like the occupation of French Guiana, was destined to be temporary, owing to the policy adopted by Argentina. See ARGENTINA.

Independence Proclaimed.—The general movement in favor of independence that transformed the Spanish colonies north, south, and west of Brazil into republics, produced conspiracies and plots in Bahia and Pernambuco. Troops were brought out from Portugal to restrain every violent manifestation of the republican spirit; meanwhile, however, in Portugal itself the revolution of 1820 had led to a modification of the old autocratic system, and the forces from that country, openly sympathizing with the aspirations of the Brazilian people, compelled King John to yield. The latter withdrew from America soon afterward (26 April 1821), leaving his son, Dom Pedro, to work out the problem in Brazil as best he might. The attitude of the Cortes of Portugal in this crisis was exceedingly unwise: instead of offering concessions, it directed the dissolution of the central government, and ordered Dom Pedro to return to Portugal. Assured of the support of the people of Rio de Janeiro and San Paulo, who requested him to disobey this command, Dom Pedro proclaimed the independence of Brazil, 7 Sept. 1822. He became constitutional emperor the following month. In the hostilities which ensued the Brazilians were so successful that independence was assured before the end of 1823. The constitution of the empire was adopted on 25 March 1824. But a peculiar situation in the ruling family remained to be disposed of. Since October 1822, Dom Pedro had been emperor of Brazil, while his father was king of Portugal. The dramatic climax occurred 25 Aug. 1825, when a treaty was signed in London by virtue of which King John first assumed the title of emperor of Brazil and then immediately abdicated in favor of his son. As the popularity of Dom Pedro I. was due to the disposition he showed at first to accede to the wishes of the liberals, so it is necessary to ascribe his loss of popularity in the years 1826-31 to his unwillingness to trust the people more and more, as their demand for participation in the government steadily increased. The statement found in some recent histories, to the effect that Pedro I. was a brutal tyrant, whose reign ended in public disgrace, is positively incorrect, and inculcates false views of this entire period. It was his tact that saved the monarchy in 1821; but the growth of republicanism in the next decade was much more rapid among the people than at his court, and finally the breach became so wide that no course was left to him but to surrender his crown before the succession of his son, the second Pedro, should be disputed, and to take ship for Lisbon, where it had become a duty to defend the claim of his daughter, Maria II., to the throne of Portugal. At any time after 1810 outrageous tyranny on the part of Portuguese rulers would have thrown Brazil into the advancing column of revolutionary states. The

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significant facts are, that Pedro I. could have postponed the inevitable change for 10 years, and that Pedro II. (whose majority was proclaimed 23 July 1840) succeeded in maintaining the monarchical form in America until 15 Nov. 1889. The regency by which the affairs of Brazil were administered (1831-40) was much like a republican government, especially after 1834. Probably it would have been impossible to revert to a monarchy if the weakness and misconduct of the regents had not brought discredit upon everything savoring of democracy; certainly the role of emperor in the largest American country could not have been sustained so long except by a sincere advocate of progress, and an enlightened patron of every humanitarian and scientific enterprise. Such was Pedro II. The suppression of the revolution of 1848; the discontinuance of the importation of slaves, in 1853; and the creditable part taken by Brazil in thwarting the ambitious designs of the Argentine dictator, Rosas (See ARGENTINA)—these are the chief events before 1855. In that year a Brazilian squadron was sent to settle a dispute with Paraguay as to the right of way for Brazilian vessels on the Paraná River, which, rising in Brazil, flowing through Paraguay, and finally through the territory of Argentina, should be open to the commerce of all three nations equally. The warships failed to accomplish the desired result, and for a decade vexatious restrictions were placed upon the vessels of Brazil, Argentina, and the United States. In 1864 an outrage by Señor Lopez, the dictator of Paraguay, brought on a war in which Brazil, Argentina, and Uruguay were allied against the offending country. (See PARAGUAY). This bitter struggle, protracted until 1870, cost Brazil the lives of many thousands of her citizens, and in money about \$300,000,000. In the year following the restoration of peace a law was enacted for the abolition of the institution of slavery, the growth of which had been checked, as we have seen, in 1853. It was provided that thenceforth every child born of slave parents should be free.

Brazil a Republic.—A bloodless revolution terminated the reign of Dom Pedro II., and the Federal republic was proclaimed, 15 Nov. 1889. A provisional government, instituted for this purpose, published (24 Feb. 1891) the constitution of "The United States of Brazil," resembling that of the United States of America in nearly every respect, though Brazilian senators serve for nine years, like those of Argentina, while the president's term of office is but four years. Marshal Deodoro da Fonseca, head of the provisional government, was confirmed in the presidency by the constitutional congress, and Gen. Floriano Peixotto was elected vice-president. The next president (15 Nov. 1894) was Prudente de Moraes Barros. The third president, Dr. Manoel Ferraz de Campos Salles, was elected for the term beginning 15 Nov. 1898. His successor, Señor Francisco de Paula Rodrigues Alves, inaugurated 15 Nov. 1902, made a statement of the national policy in his inaugural address which should receive general attention. It may be summarized as follows: A good financial condition in the republic is of prime importance; but scarcely less essential are reforms in the laws applicable to civil suits and elections. Agricultural and commercial conditions must be improved, and endeavors made to

attract immigration and capital. Modern systems of sanitation must be installed at the ports, including Rio de Janeiro. The augmentation of the army and navy may be undertaken when the condition of the treasury warrants such expenditures.

It will be readily understood that the circumstances to which reference has been made in this sketch—such as the issuance of large amounts of paper currency, which it was formerly the fashion to call irredeemable; the change from the basis of slave to free labor; the overthrow of the monarchy; foreign wars, and rebellions in one state after another—have combined to depress Brazilian credit and retard industrial development. To these unfavorable influences must be added the decline in the prices of coffee, Brazil's staple product, and of sugar, her chief reliance in times past. On the other hand there is observable a tendency toward greater stability in the national policy; a large amount of paper money has been called in and destroyed; and at least a moderate interest has been shown recently in efforts to develop the enormous natural resources of the country.

The complete statistics of the import and export trade of Brazil for the year 1901 (the latest which can be satisfactorily analyzed), show the following results: Imports were valued at £19,702,758, exclusive of bullion; exports were £40,621,993. The imports from Great Britain formed 31.389 per cent of the entire import trade; exports to the same country and its possessions, 12.951 per cent of total export trade. Imports from the United States amounted to £2,463,938; exports to the United States, £17,462,650, being 43.116 per cent of the whole merchandise exported from Brazil. Imports from Germany were £1,868,751; exports to Germany, £6,014,812. France imported Brazilian goods to the value of £4,761,907. Argentina exported to Brazil merchandise of the value of £2,651,287. The balance of trade in favor of Brazil is seen to depend chiefly upon the exchange of products with the United States. An estimate for the year 1900 shows imports from the United States, \$11,516,681; exports to the United States, \$64,914,507. In 1902, the imports from the United States appear to be somewhat less than in 1900, while the exports to the United States show a considerable increase. During the 30 years preceding 1902, the United States has purchased from Brazil goods to the amount of \$1,762,622,527, and sold to her goods to the amount of only \$303,813,166—the balance of trade in favor of Brazil for that period being \$1,458,809,361, contributed by the United States alone. Keeping these figures in mind, we now examine the last message of President Campos Salles (3 May 1902), which shows the improvement in the financial situation by comparison of the year 1898 with 1902. In the former year, he says, gold payments were suspended; the paper money in circulation amounted to 788,364 centos; the rate of exchange average 7 3-16; amount required for the redemption of the funding loan was 115,997 centos; Brazilian bonds were at 50 per cent discount; the amount due on the 1897 loan was £1,122,083; treasury notes to the amount of 20,350 centos of reis were in circulation; the treasury owed 11,000 centos of reis to the Banco da Republica; £274,604 were due for war material. To meet these various debts there were in the treasury 5,500 centos, and £81,713 in the agency

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at London. In 1902 gold payments had been resumed; the paper money in circulation was reduced by 107,000 centos of reis; the rate of exchange was 12d.; the paper money in circulation, which formerly was worth only £23,500,000, had increased in value to £34,000,000; Brazilian bonds abroad were quoted 35 per cent higher; the rest of the 1897 loan had been paid; not a single treasury bill was in circulation. There were £2,000,000 in cash in London, besides 1,000,000 in consols, and 12,000 centos deposited in the Banco da Republica. "Finally, the era of deficits has been banished, and that of surpluses has been instituted." The enormous advantage of Brazil in her trade with the United States makes such results possible, and places much more ambitious financial achievements easily within her reach. The total debt of the republic, expressed in gold of the United States, was stated to be \$440,701,893 in 1901.

Army and Navy.—The Brazilian navy in 1901 comprised: 2 battleships of the old style; 2 coast-defense vessels, comparatively modern; 2 old monitors; 7 small cruisers, of which number 3 were unarmored; 6 gunboats, armored, and 18 unarmored; 24 torpedo-boats of all classes; 4 torpedo-cruisers; 2 submarine boats. To man these vessels there were 4,000 seamen, 1,000 stokers, and 450 marine infantry. The army included 484 staff officers; 1,573 officers and 9,035 men in the infantry, and, in the cavalry and engineers, 606 officers and 3,179 men, and 1,400 cadets. The only serious war-cloud at the beginning of 1903 arose out of a dispute with Bolivia over the Acre territory. See ACRE.

Climate.—The rainy season begins for the hot lowlands of the north in December or January and continues until May or June, the remaining half of the year being dry. In the highlands of the southern and central regions the four seasons of the year are well defined. Throughout the Amazon basin the seasonal variation of temperature is small—from 75° to 90°; and the prevailing winds, the "trades" from the east, mitigate the equatorial conditions. In the high plains of the states of Rio Grande do Sul and San Paulo the mercury sometimes falls to the freezing point. Except in the neighborhood of swamps, marshy or undrained districts, etc., the climate is moderately healthful, and the mortality in the best of the towns does not compare unfavorably with that of cities in the United States.

Resources.—In 1902 the exports of coffee to the United States amounted to 764,658,963 pounds, valued at \$47,004,453. The total exports of rubber from the Amazon valley (lower, upper, and Iquitos districts) in 1901 were 46,992 tons. Tobacco, cotton, cacao, Brazil nuts, rice, sugar—these are some of the vegetable products. There is practically no limit to the number of agricultural enterprises that can be successfully carried on in the table-lands, the broad, open valleys, and the lowlands forming the basin of the Amazon. In the higher regions and mountains the mineral wealth of the republic is being developed. During the first seven months of 1901, 2,435,866 grams of gold, 37,915 tons of manganese, and precious stones to the value of 464 centos, were exported from the state of Minas Geraes. The iron-ore regions are situated within a zone of about 3,200 square miles, from 3,000 to 5,000 feet above the level of the sea, and about 310 miles from Rio de

Janeiro, which is the nearest port. The output of diamonds and carbons in the state of Bahia is of special interest. Prior to the discovery of the South African mines this was the greatest diamond-producing centre, and the Paranguaçu district is the only place in the world where carbons are found of marketable size. An excellent statement is made by Señor Fontoura Xavier, consul-general of Brazil in New York, who enumerates the gems found in Goyaz, Matto Grosso, Paraná, Rio Grande do Sul, and San Paulo, as well as in the states mentioned above. Black diamonds, emeralds, sapphires, rubies, beryls, amethysts, garnets, opals, chalcedonies, sapphirines, agates, and cornelians are found, some of them in great abundance. "One of the carboniferous basins of Brazil is in the state of Santa Catarina. In the state of Rio Grande do Sul there have been discovered four large outcrops of coal. Bitumen exists in nearly all of the states." Native sulphur, nitrate, salt, sulphate of magnesia are also mentioned. The average annual value of the gold and diamonds exported is said to be about \$7,400,000. In Rio Grande do Sul are copper mines, in Paraná quicksilver mines; galena and lead mines in widely separated regions. MARRION WILCOX.

The revenues of Brazil for the fiscal year 1903 were estimated at 40,967,942 *milreis*, gold, and 248,018,000 *milreis*, paper.

The various sources from which receipts were estimated and their amounts in *milreis* were as follows:

	Gold	Paper
Revenues from imports.....	31,420,000	122,722,000
Internal revenue.....	1,337,666	36,743,000
Consumption taxes.....	.....	32,660,000
Extraordinary revenues.....	180,276	6,755,000
Paper-money redemption fund.....	.....	2,150,000
Paper-money guaranty fund.....	7,870,000	1,658,000
Lease of Government railways.....	160,000	5,200,000
Amortization of internal debt.....	.....	2,530,000
Port-improvement fund.....	.....	.....
Total	40,967,942	248,018,000

The expenditures for the same period were estimated at 41,399,062 *milreis*, gold, and 244,462,545 *milreis*, paper, and are distributed as follows:

	Gold	Paper
Department of Justice and Internal Affairs.....	.....	16,424,481
Department of Foreign Relations.....	905,500	631,920
Navy Department.....	.....	26,700,664
War Department.....	.....	47,569,437
Department of Industry, Communications, and Public Works.....	3,783,315	68,030,477
Department of Finance.....	30,710,247	85,105,565
Total	41,399,062	244,462,545

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Brazil', Ind., a city and county capital of Clay County, 16 miles northeast of Terre Haute. It is an important railroad centre and in its vicinity are rich mines of block coal. Inexhaustible deposits of clay and shales are also found here and the city contains manufactures of pumps, tiles, machinery, etc. Brazil was incorporated in 1873, is governed by a mayor, elected quadrennially, and a city council; has a public library and controls its own waterworks. Pop. (1900) 7,786.

Brazil Cabbage, or Chow Caraibe (*Caladium sagittifolium* or *Xanthosoma sagittifolium*), a West Indian plant of the natural order *Araceae*, widely cultivated in the tropics for its starchy edible tubers, which are used like potatoes, and its succulent leaves, which are cooked like spinach. The plant almost entirely lacks the acrid principle which characterizes other members of the order.

Brazil-nut, Castanea, Cream Nut, Nigger-toe, Para Nut, the seeds of two species of Brazilian trees, the only ones of their genus, of the natural order *Myrtaceae*. The better known species, *Bertholletia excelsa*, is a tree which often attains a height of 150 feet and a diameter of four feet. It has bright green, leathery leaves, two feet long and six inches wide, and cream-colored flowers followed by very hard-shelled

fruits about six inches in diameter, containing about 20, three-sided, wrinkled seeds which are largely exported from Para and from ports of French Guiana. They are used for dessert and confectionery and for the manufacture of an expressed oil used in oil painting, lubricating, and lighting. Though of stately dimensions, the tree is of little decorative use. It covers extensive tracts in northern Brazil, and is especially abundant along the Amazon and Orinoco rivers. The seeds of the monkey-pot tree, known as sapucaia nuts (q.v.), are considered superior to Brazil-nuts, but are not yet commercially important, owing to the distance they must be transported from the interior country.

Brazil Tea, a drink prepared from the leaves of *Ilex paraguensis*. See MATÉ.

Brazil-wood. A dark-red or brown dye-wood exported from the West Indies, Brazil, and other South American countries. Various grades appear in the market under diverse names, such as Pernambuco wood (*Casalpinia echinata*), St. Martha wood, and All Saints' wood, which are most valued. Except in a few cases botanists have not definitely determined the species which furnish the different grades, but large quantities are derived from *C. brasiliensis*, a small tree, bipinnate leaves, and flowers in panicles. It is indigenous in rocky ground, especially in the West Indies. The valuable part is the heart-wood, of which there is but little when compared with the thick, valueless sap-wood. This useful part is at first light colored, but becomes dark when exposed to light, air, moisture, etc. Formerly it was largely used in dyeing, but coal-tar dyes and other manufactured dyes have generally supplanted it. It is still used in ink-making. The name is said to be derived from Braxilis, not Brazil, since sappan wood (q.v.), which is believed to be identical, was used prior to the discovery of America.

Brazil'to. See BRAZIL WOOD.

Brazilian Grass, an incorrect name popularly applied to a substance used in the manufacture of a very cheap kind of hats, known as Brazilian grass hats, and also as chip hats. It consists of strips of the leaves of a palm, *Chamærops argentea*, which are imported for this manufacture, and chiefly from Cuba.

Braz'ing, or Brass-soldering, the process of uniting two pieces of brass, two pieces of copper, or one of each by means of a hard solder, that is, a solder which fuses at a comparatively high temperature. The solder is applied in the form of a coarse powder, and is always mixed with borax, to prevent the oxidation of the metals soldered together. It is usual to moisten this mixture with water before spreading it over the surfaces to be joined. When the solder has been applied in this state, the pieces of metal are slowly heated, by which the water is made to evaporate, leaving a crust of the solder on the parts where it is required. The pieces are then exposed to a stronger heat, until the borax melts and fluxes the solder, which suddenly flushes the joints of the pieces of metal, and thus unites the two surfaces, making them into one piece. The whole is now allowed to cool, and is afterward dressed with a file. Pieces of metal united in this way are held together as firmly as if they were only one piece.

BRAZOS — BREACH

Brazos, brä'zōs, formerly called **Brazos-de-Dios**, a large river in Texas, rising in the elevated region of northwestern Texas, once known as the Staked Plain, between the parallels of 33° and 34°. It flows southeastward between the Colorado and Trinity, and after a course of about 900 miles falls into the Gulf of Mexico, between Quintana and Velasco, 40 miles west-southwest of Galveston. It is navigable by steamers during the wet season for about 300 miles. Among the towns on its banks the chief is Waco, about halfway from its mouth, now an important railway centre. The cotton plantations on the Brazos are highly productive.

Brazos de Santiago, da sän-te-ä'gō, Texas, a village 30 miles east of Brownsville, on the northern bank of the Rio Grande, in Cameron County. The battles of Palo Alto and Resaca de la Palma, in 1846, were fought about half way between Brazos and Matamoras. It carries on much coasting and foreign trade, although a shifting sand bar is a serious obstacle to its commerce.

Brazza, brät'sa (ancient BRACHIA), an island of Austria, in the Adriatic Sea, belonging to Dalmatia, of which it constitutes a separate administrative district; lat. 43° 16' N.; lon. 16° 37' E. It is 24 miles long, and from five to seven broad; contains 20 villages, and is separated from the mainland by a channel 12 miles broad, which affords excellent anchorage for shipping. The island is mountainous and well wooded; and in the valleys vines are grown, from which are made the best wines in Dalmatia. It produces also good oil, almonds, and saffron, and grain in small quantity. Much attention is paid to the cultivation of bees and silk-worms. The chief town, St. Pietro di Brazza, has a small port, defended by a mole. At Milna there is a considerable shipbuilding yard. Pop. (1900) 24,465.

Brazza-Savorgnan, Pierre Paul François Camille, pē-är pōl frañ-swä kä-měl brat-sä-vör-nyän, French explorer: b. on board ship, off Rio de Janeiro, Brazil, 26 Jan. 1852. He entered the French navy in 1875, after becoming a naturalized French citizen, and during 1876-8 explored the Ogowe and Congo regions of Africa, and made treaties between France and the natives, founding Franceville and several other villages. In 1886 he was made governor of the French Congo and Gaboon colonies, which he had thus secured. Brazzaville on the Congo River is named after him. After a sojourn in France, he returned to Africa in 1890 as commissioner-general of the whole of French Congo. The next six years were spent in explorations and securing of French authority in central Africa, after which, in 1897, he returned to France.

Brazzaville, brät'sa-vël, a town on the French side of the Congo at the lower end of Stanley Pool. It stands nearly opposite Leopoldville, in the Congo Free State. See BRAZZA-SAVORGNAN.

Breach, the aperture or passage made in the wall of any fortified place, by the ordnance of the besiegers, for the purpose of entering the fortress. They should be made where there is the least defense, that is, in the front or face of the bastions. In order to divide the resistance of the besieged, breaches are commonly

made at once in the faces of the attacked bastions and in the ravelin. This is effected by battering, and at such places as the cannon do not reach, by the aid of mines. The breach is called practicable if it is large enough to afford some hope of success in case of an assault. This is generally considered to be the case if it allows a passage to 14 men abreast. Frequently, however, a breach of much less extent, even of half that width, may be entered.

Breach, any violation of law or obligation. A continuing breach is one where the condition of things constituting a breach continues during a period of time, or where the acts constituting a breach are repeated at brief intervals. In pleading, a breach is that part of the complaint in which the violation of the defendant's contract is stated. It is usual in assumpsit, where the common-law rules of pleading are still in force, to introduce the statement of the particular breach, with the allegation that the defendant, contriving and fraudulently intending craftily and subtly to deceive and defraud the plaintiff, neglected and refused to perform, or performed the particular act, contrary to the previous stipulation. In debt, the breach or cause of action complained of must proceed only for the non-payment of money previously alleged to be payable; and such breach is very similar whether the action be in debt on simple contract, specialty, record, or statute.

Breach of Promise of Marriage.—An action lies for this on the part of either man or woman, though, as a rule, only the latter is believed to be substantially injured or deserve damages. There must be a legal and valid consideration, but as there are always mutual promises they are a sufficient consideration for each other. The minds of the parties must meet; that is, there must be a request or proposition on the one side and an assent on the other. If the communications between the parties are verbal, the only questions which usually arise relate to evidence and proof. The exact words or time or manner of the promise need not be proved, but it may be inferred from the conduct of the parties and from the circumstances which usually attend a promise to marry. (15 Mass. 1; 2 Penn. St. 80.) When the parties are at a distance from each other, and the offer is made by letter, it will be presumed to continue for a reasonable time for the consideration of the party addressed, and if accepted within a reasonable time, and before it is expressly revoked, the contract is then complete.

A promise of marriage is not within the third clause of the fourth section of the statute of frauds, relating to agreements made upon consideration of marriage; but if not to be performed within one year it is within the fifth clause, and must therefore be in writing in order to be binding. If no time be fixed and agreed upon for the performance of the contract, it is in contemplation of law a contract to marry within a reasonable period after request, and either party may call upon the other to fulfill the engagement, and in case of default may bring an action for damages. If both parties lie by for an unreasonable period, and do not treat the contract as continuing, it will be deemed to be abandoned by mutual consent. The defenses which may be made to an action for breach of promise of marriage are, of course, various; but

BREACH

it is only necessary to notice in this place such as are in some degree peculiar. Thus, if either party has been convicted of an infamous crime, or has sustained a bad character generally, and the other was ignorant of it at the time of the engagement; or if the woman has committed fornication, and this was unknown at the time to the man who promised to marry her; or if the woman is deeply involved in debt at the time of the engagement, and the fact is kept secret from her intended husband; or if false representations are made by the woman, or by her friends in collusion with her, as to her circumstances and situation in life and the amount of her fortune and marriage portion,—any of these facts, if properly pleaded, will constitute a good defense. If after the engagement either party is guilty of gross misconduct, inconsistent with the character which he or she was fairly presumed to possess, the other party will be released. If the woman insists upon having her property settled to her own personal use, it is said that this will justify the man in breaking off the engagement. So, if the situation and position of either of the parties as regards his or her fitness for the marriage relation is materially and permanently altered for the worse (whether with or without the fault of such party) after the engagement, this will release the other party.

Breach of Warranty.—In sales of personal property an express warranty is one by which the warrantor covenants or undertakes to insure that the thing which is the subject of the contract is, or is not, as there mentioned; as that a horse is sound, that he is not five years old, etc.

An implied warranty is one which, not being expressly made, the law implies by the fact of the sale. For example, the seller is understood to warrant the title of goods he sells, when they are in his possession at the time of the sale. (1 *Ld. Raym.* 593.) In general there is no implied warranty of the quality of the goods sold. The rule of the civil law was that a fair price implied a warranty of quality. This rule has been adopted in Louisiana and South Carolina. There may be an implied warranty as to character, and even as to quality, from statements of the seller, or a purchase for a specified purpose. Any substantial failure, in the article supplied to the buyer in pursuance of the contract of sale, to come up to the quality warranted, amounts to a breach of the warranty, and proof of it establishes the buyer's right to an action therefor. This rule applies to all cases where the remedy sought is by an action on the warranty for damages, or by way of set-off in a suit for the purchase-money; in such cases the buyer is bound to prove the breach and the damages suffered by him in consequence of it, and can recover only to the extent of the damage so proved. A warranty of soundness does not extend to a visible defect. A vendor of personal property is not liable for latent defects, known to him, but unknown to the purchaser, unless he has used some artifice to deceive the purchaser in regard to such defects or has warranted the article. Where an article is warranted as fit for a certain purpose, the seller is liable for an injury sustained by the vendee in consequence of its unfitness. Under an executory contract to sell goods *in transitu*, the vendor is obliged to tender a merchantable article. On a sale of an article known to be intended for food there is an implied warranty that it is sound, wholesome,

and fit to be used as an article of food. (15 *Hun.* 504.) The authority of an agent to warrant goods sold will be implied where it is usual in the market to give a warranty on the sale of such goods; such authority, however, will be implied only as to goods sold at the time of the warranty, which will not extend to subsequent sales in the absence of express warranty.

Breach of Duty.—The non-performance of a duty, or the performance of it in such a manner that injury is done to one's employer, through want of integrity or due diligence and skill. It is assumed that there is an implied contract between an employer and the person that he employs, according to which the latter agrees to perform the duties entrusted to him in such a manner that the interests of his employer shall not suffer. In case of breach of duty, what is called an action of *assumpsit*—that is, an action for the recovery of damages for the non-performance of a promise, which, though not under seal, is yet founded on proper consideration—may be brought by the one who has sustained an injury, against the persons by whom the breach has been committed.

Breach of Peace.—The taking part in any riot, affray, or tumult, which is destructive to the public tranquillity, or the causing others to do anything to injure the public tranquillity. The former are actual, the latter constructive breaches. In both cases the breach of the peace may be either felonious or not felonious. The felonious breaches of the peace are three in number: (1) The riotous assembling of 12 or more persons, and not dispersing upon proclamation; (2) the riotous demolishing of churches, houses, buildings, or machinery; (3) maliciously sending, delivering, or uttering, or directly or indirectly causing to be received, knowing the contents thereof, any letter or writing threatening to kill or murder any person. The remaining offenses are not felonious, and include: (1) affrays; (2) riots, routs, and unlawful assemblies, which must have at least three persons to constitute them; (3) tumultuously petitioning; (4) forcible entry or detainer, which is committed by violently taking or keeping possession of lands or tenements with menaces, force, and arms, and without the authority of the law; (5) riding, or going armed, with dangerous or unusual weapons, terrifying the good people of the land; (6) spreading false news; (7) false and pretended prophecies, with intent to disturb the peace. Finally, there are two constructive breaches of the peace, namely, challenging another to fight, or bearing such a challenge, and the making public by either printing, writing, signs, or pictures, malicious defamations of any person, especially a magistrate, in order to provoke him to wrath or expose him to public hatred, contempt, and ridicule.

Breach of Trust.—A violation of duty by a trustee, executor, or any other person in a fiduciary position. A trustee is not permitted to manage an estate entrusted to him, in such a manner as to derive any advantage to himself, and at the same time he is bound to manage it in such a manner that the person for whom he has it in trust shall reap from it the greatest possible advantage. Accordingly money held in trust by a trustee must be invested by him in government stock, or in certain other special securities, for the behoof of him for whom he has the money in trust; and if he has not done

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so he is, as a general rule, liable for interest on the trust funds. Formerly it was the duty of the trustee to invest money in government securities alone, but under certain acts (unless the trust deed expressly forbids) a number of other sound investments are allowed. A trustee who has grossly mismanaged his trust may have to repay money lost, with interest, and sometimes compound interest. (See TRUSTEE.) The court of chancery has adopted two rules to guide the decisions with respect to the liability consequent upon a breach of trust. The purport of the first is, that with a view not to strike terror into persons acting for the benefit of others, the court will deal leniently with trustees who have endeavored fairly to discharge their duty, and in case of any misapplication of the trust money the court will not hold the trustees liable on slight grounds. The second rule is, that care must be had to guard against any abuse of their trust on the part of the trustees. A fraudulent misuse of trust funds is punishable as a misdemeanor with fine and imprisonment.

Bread and Bread Making. Bread is the product obtained by baking a mixture made of wheat flour or the meal from any cereal and water alone, milk, or milk and water, shortening and yeast, or baking powder. Unleavened bread is that made without yeast or other leavening agent. Ordinarily, the term bread is applied to the product made from wheat flour, but other cereals either alone or mixed with wheat are used for bread-making purposes, as rye, corn, and, to a limited extent, barley. Wheat and rye, however, are the only cereals which yield a gluten specially adapted to retaining gas and producing a light, porous dough and bread.

Bread making is an ancient art. In prehistoric times there is abundant evidence of the baking and use of cereals as food. The earliest historians speak of bread and bread making. Bread is frequently mentioned in the Bible, particularly unleavened bread, suggesting that leavened bread was known at that time. It was in Egypt that bread making first reached any degree of perfection. The art of bread making has kept pace with the advance of civilization, the more perfect the system of bread making, the higher the grade of civilization. From Egypt, bread making was introduced into Greece and from there into Italy, and later it followed with the advance of Roman civilization. Among the more civilized American Indian nations, particularly the Aztecs and cliff-dwellers, bread making reached a comparatively high grade.

Methods of bread making vary considerably among different nations, although the underlying principles with all are essentially the same. The main differences are in the way in which the yeast or ferment material is employed, and the method of manipulation. During recent years, study of the yeast plant has resulted in improved methods of bread making. The purity of the yeast and the quality of the flour are the two most essential features for the production of bread of good quality.

Yeast is a unicellular plant which readily reproduces itself by the process of "budding" when added to a batter containing small amounts of saccharine, mineral, and nitrogenous matter. Flour contains all of the food required for the propagation of the yeast plant, which secretes a number of chemical compounds called enzymes which are active agents in bring-

ing about the chemical changes that take place in bread making. Pasteur in his work on fermentation states: "In introducing a quantity of yeast into a saccharine wort, it must be borne in mind that we are sowing a multitude of minute living cells, representing so many centres of life, capable of vegetating with extraordinary rapidity in a medium adapted to their nutrition. This phenomenon can occur at any temperature between zero and 55° C. (131° F.), although a temperature between 15° C. and 30° C. (59° F. and 86° F.) is the most favorable to its occurrence." The individuality of the yeast plant, the nature and amount of its food supply and the conditions under which it develops determine the value of the yeast. When compelled to work in the presence of or to contend with other ferment bodies, the yeast is contaminated and is of lessened value for bread-making purposes. Yeast, like plants of higher orders, is often poorly nourished. Yeast used for brewing purposes is developed from healthy, vigorous, well-nourished yeast plants, and is called high yeast. See BREWING.

The different forms in which yeast is used, as dry cakes, sour dough, compressed soft cakes, brewers' yeast, etc., are simply different ways for preserving and introducing the yeast into the dough so as to leaven the entire mass. The different kinds of yeast vary with the individuality and character of the yeast plants.

Air takes an important part in bread making; its action upon yeast is briefly summarized by Pasteur as follows: "Fermentation by means of yeast appears, therefore, to be essentially connected with the property possessed by this minute cellular plant of performing its respiratory functions, somehow or other, with oxygen existing combined in sugar. Its fermentative power varies considerably between two limits, fixed by the greatest and least possible access to free oxygen which the plant has in the process of nutrition. If we supply it with a sufficient quantity of free oxygen for the necessities of life, nutrition, and respiratory combustions; in other words, if we cause it to live after the manner of a mold, properly so called, it ceases to be a ferment; that is, the ratio between the weight of the plant developed and that of the sugar decomposed, which forms its principal food, is similar in amount to that in the case of fungi. On the other hand, if we deprive the yeast of air entirely, or cause it to develop in a saccharine medium deprived of free oxygen, it will multiply just as if air were present, although with less activity, and under these circumstances its fermentative character will be most marked; under these circumstances, moreover, we shall find the greatest disproportion, all other conditions being the same, between the weight of yeast formed and the weight of sugar decomposed. Lastly, if free oxygen occur in varying quantities, the ferment power of the yeast may pass through all the degrees comprehended between the two extreme limits of which we have spoken."

According to Brown, "yeast cells can use oxygen in the manner of ordinary aerobic fungi, and probably require it for the full completion of their life-history; but the exhibition of their fermentative functions is independent of their environment with regard to free oxygen."

From the investigations of Pasteur, Brown, and others, it would appear that during knead-

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ing and aeration, the fermentation process is changed from anaerobic to aerobic form, which appears necessary in order that the full development and complete workings of the yeast cells can take place.

The principal chemical changes which take place in bread making are: (1) production of carbon dioxide and alcohol; (2) change of insoluble carbohydrates to soluble form; (3) production of lactic and other acids; (4) formation of volatile hydrocarbon derivatives; (5) change of solubility and molecular structure of the proteid compounds; (6) formation of amide and ammonium compounds from proteids; and (7) partial oxidation of the fat. The agents which bring about these chemical changes are ferments and heat. The yeast plant, as previously stated, secretes a number of enzymes or chemical products which are active agents in producing chemical changes. Diastase and invertase act upon the carbohydrates forming dextrose sugars which undergo alcoholic fermentation. This results in the production of about one per cent each of carbon dioxide and alcohol. During the process of baking, nearly all of the alcohol is expelled, as only traces of alcohol have been obtained in fresh bread. The joint action of the yeast and heat upon the starch granules results in changing about 6 per cent of the starch to soluble forms as dextrin and dextrose sugars. Some of the starch grains are ruptured, others are partially disintegrated by the ferment action, while many appear to be unaltered. These physical changes of the starch granules render bread more susceptible to the action of the digestive fluids.

Lactic, acetic, and occasionally butyric and other acids are formed during bread making, particularly if the alcoholic ferment becomes inactive and sour dough is formed. From .3 to .4 per cent of acid, calculated as lactic acid, is formed and unites with the gluten proteids during the baking process. The amount of volatile hydrocarbon derivatives formed during bread making is small, less than .10 of a per cent. These compounds give the characteristic aroma to freshly baked bread.

The wheat proteids undergo a number of chemical changes during bread making. (See WHEAT; WHEAT FLOUR.) While the proteids of wheat are mainly in the form of insoluble gluteins, small amounts are present as albumin and globulin. Wheat gluten is composed of two substances: gliadin, a glue-like body, and glutenin, a gray powder to which the bands of gliadin adhere. Gliadin constitutes the binding material of the flour, and enables the dough to retain the carbon dioxide gas formed during fermentation and this leavens the bread. An excessive amount of gliadin produces a soft sticky dough, while an excess of glutenin reduces the power of expansion of the dough. In hard wheat flours, the gluten is composed of about 35 per cent glutenin and 65 per cent gliadin. The ratio of gliadin to glutenin determines very largely the quality of the bread. The removal of the gliadin proteid from flour results in a loss of bread-making properties, as the dough fails to expand. Any interference with the gliadin-glutenin ratio in flour affects its bread-making qualities.

Yeast is employed in bread making, not only to produce gas and expand the dough, but also

to produce other chemical changes as formation of acid bodies that combine with the proteids to form acid proteids which frequently favorably affect the gliadin-glutenin ratio. Because of the difference in the amounts of gliadin and glutenin in flours, the methods of bread making must be varied to meet the requirements of different kinds of flour.

In average bread making, from 1½ to 2 per cent of dry matter is lost by fermentation and the formation of volatile products as carbon dioxide, alcohol, volatile hydrocarbons, and ammonium products. The losses fall alike upon both the carbohydrates and proteids. With prolonged fermentation, the losses of dry matter may amount to 5 per cent or more.

Bread varies in chemical composition according to the quality of the flour from which it is made. Some flours contain 12 per cent and more of proteids, while others contain 8 per cent and less, according to the composition of the wheat from which the flour has been milled. (See WHEAT.) Flours of high protein content contain proportionally less starch than low protein flours. The starch and protein content of flour and bread vary inversely.

COMPOSITION OF BREAD.

Bread made from white straight grade flour of:	Water Per cent	Protein Per cent	Starch and Carbohydrates Per cent	Ash Per cent	Fat Per cent
(1) High protein content	36.97	10.12	51.70	.45	.76
(2) Average protein content	32.90	9.57	55.44	.81	1.28
(3) Low protein content	32.10	7.21	50.29	.52	.88

When either whole or skim milk is used, the bread contains more protein. The use of milk in bread making is desirable because of its increasing the nutritive value of the bread product. The amount of fat in bread varies with the amount of lard, butter, or other form of shortening used in the making. Occasionally a large amount of lard is used to prevent the bread from drying out too rapidly.

The composition of bread is influenced also by the method of milling the wheat. The outer and aleurone layers of the wheat kernel contain more nitrogen, fat, and ash than the floury portion, hence their addition, as in graham and entire-wheat flours causes the bread to be richer in these compounds. When milled from the same lot of wheat, graham, entire-wheat, and white flours have the following composition:

	Protein Per cent	Fat Per cent	Carbohydrates Per cent	Ash Per cent
Straight (white flour) ..	11.99	1.61	75.36	.56
Entire-wheat flour	12.26	2.24	73.67	1.02
Graham flour	12.65	2.44	74.58	1.72

Digestion experiments have shown that the finer grades of white flour are more digestible than either graham or entire-wheat flour; the

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comparative digestibility of the three kinds of flour being as follows:

	Per Cent Digested		
	Protein	Carbo-hydrates	Calories
White bread.....	85.3	97.5	90.1
Entire-wheat bread...	80.4	94.1	85.5
Graham bread.....	77.6	88.4	80.7

The higher degree of digestibility of the white bread results in its furnishing a larger amount of available nutrients to the body than is supplied by either graham or entire-wheat. The available nutrients in the three kinds of flour milled from the same lot of wheat are as follows:

	Protein Per Cent	Carbo- hydrates Per Cent	Calories Per gram
White flour.....	10.2	73.5	3.650
Entire-wheat	9.9	69.3	3.445
Graham	9.8	66.3	3.350

White bread when properly made from a glutinous flour has a high degree of digestibility, and with the exception of some of the oat preparations supplies the body with more available nutrients than is secured from any other cereal.

Bread is not generally subject to adulteration, although various forms of sophistication have been practised. The most common form of adulteration is the use of a small amount of alum with damaged and inferior grades of flour. Occasionally rye bread is in part prepared from wheat flour. Wheat bread also has been prepared from flour of mixed cereals, as corn and wheat. During recent years this practice has practically ceased in the United States owing to national laws regulating the taxing and branding of wheat flours when mixed with other cereals or materials.

During the process of baking, the temperature of the oven may range from 225° to 260° C.; the interior of the loaf, however, does not reach 100° C. Various forms of ovens, heated in different ways and with different kinds of fuel are in use. Modern bake ovens are usually so constructed as to secure the highest efficiency from the fuel consumed and to prevent unnecessary losses of heat by radiation. Some ovens are provided with self-registering thermometers and thermostats for the regulation of the temperature, also devices as trucks, racks, and trays for receiving the bread. The bake-ovens in use in different countries vary widely in form and method of heating. Before stoves were used, bread was baked in special ovens usually adjacent to open fireplaces. In some localities, brick bake-ovens were built out of doors. A fire was made in the oven and when the bricks were sufficiently heated, the coals were removed and the unbaked bread was placed in the hot oven, where it readily baked. This plan of heating ovens is even now in use in some European countries. For home bread-making purposes in the United States stoves provided with bake-ovens are used almost exclusively.

Bread, as offered in the market, is made in loaves of various forms, which usually weigh about one pound. In some countries laws regulating the weight of the bread are rigidly enforced, and bakeries are subject to sanitary inspection. During the process of doughing, flour will absorb from 40 to 60 per cent of water. During the baking process a part of this water is expelled as steam. On account of the additional water absorbed, a pound loaf of bread can be made from .65 to .75 pounds of flour. A barrel of flour weighing 196 pounds will make from 275 to 300 pound loaves of bread, which will contain about 170 pounds of dry material. Since bread readily loses water, allowance is usually made in baking for subsequent shrinkage in weight. Because of greater power for absorption of water, some flours are more valuable for bread-making purposes than are others. The larger the amount of gluten which a flour contains, the greater is the power to absorb water and to produce a large number of loaves per barrel. A low gluten content influences the moisture content of bread more than it does the size of the loaf. Flour which contains a well-balanced gluten can have 10 or even 20 per cent of starch or other material added without influencing the size of the loaf, and on the other hand, the addition of moist gluten to dough does not materially increase the power of expansion or the size of the loaf. Flours which possess poor qualities of expansion are often improved by blending with those of different character. In many larger bakeries, special machinery has been devised for the blending of different qualities of flour. In some bakeries, one kind of flour is used for making the sponge which is then mixed with another kind in making the dough. Some of the more expensive and higher grades of flour are often used in this way to impart quality to the bread product. Comparative baking trials are made when flours are tested for technical purposes, the same weight of flour, yeast, water, and other materials being used. From the tests the physical properties of the bread are determined, as color, size of loaf, weight, odor, and taste.

Special trade names are given to different kinds of bread. In some bakeries, a bread known as home-made or domestic bread is made. Different kinds of bread are usually due to differences in manipulation, as extent of fermentation, kneading, lightness of dough, etc. For domestic purposes, a moist loaf of good quality is usually preferred to one that is extremely porous and readily dries. Different names are applied to various bread products, as Vienna bread, a high-grade white bread made with yeast, milk, shortening, salt, and in some instances a small amount of sugar. Various other ingredients are sometimes used in bread making, as potatoes, potato starch, potato water, barley water, buttermilk, molasses, etc. These materials take only a secondary part in the process, influencing the taste and flavor more than the composition, unless used in large amounts. The flavor of bread is due to the small amount of ethereal products formed during fermentation by the action of the ferments in the yeast and the soluble ferments or enzymes in the flour. Undesirable as well as the desirable flavoring products are developed during the process of fermentation in case the yeast is of poor quality or the flour is unsound.

BREAD-FRUIT — BREAD-NUT

There are many different kinds of bread made from the different cereals, as pumpernickel, which is made from the graham of rye, flat bread made in large flat cakes without yeast from wheat flour, and baked on the top of a hot stove. This bread is extensively used in the Scandinavian countries. Black bread is used by the peasantry in many European countries.

Aerated bread is made by forcing carbon dioxide through the dough instead of securing a like result by fermentation with yeast, etc., as in the ordinary method of bread making.

For home bread making, Miss Shepperd in her 'Hand-Book of Household Science,' gives the following directions: "Bread with Home-Made Yeast.—One cup of good home-made yeast, one cup of milk and water (one half cup of each) and two level teaspoonfuls of salt. Have the temperature of liquid and flour 75° F. and make into a dough stiff enough to handle without flour, let rise three hours, or until double in size, keeping always at 75° F., and when risen, mold into loaves, let stand one hour and bake." The home-made yeast is made as follows: "Stir one half pint of flour to a smooth batter with one half pint of cold water. Over this pour one quart of boiling water, pouring slowly and stirring rapidly. Place over the fire, and cook four or five minutes. Add two level tablespoonfuls of sugar and one of salt. When cooled to 75° F., add one ounce of compressed yeast, or one pint of home-made yeast. Keep as nearly 75° F. as possible for 24 hours, stirring down once in four or five hours. Keep in a glass jar in a cool place. The jar must be thoroughly washed and scalded before putting fresh yeast into it."

"Compressed Yeast Bread.—To make bread with compressed yeast, break a one-half ounce cake of compressed yeast into small pieces in a cup, and cover with cold water. Place in a bowl one pint of liquid — one half milk and one half water. Make the temperature of the mixture 75° F. Into this liquid put two level teaspoonfuls of salt, stir in a cup of sifted flour; stir the yeast and water in the cup, and pour into this; put in another cup of flour and beat it well. Continue to stir in flour, keeping sides of bowl clean, and kneading with the spoon until nearly stiff enough. Then bathe the hands, wipe them dry, flour the board, and knead the dough until it ceases to adhere to the hands or board, when no flour is used. Grease the bowl with some nice-flavored fat and treat the top of dough after putting into the bowl in the same way. Cover the bowl with a white cloth and allow the dough to rise. See that the air is not cooler or warmer than 75° F. Let the dough rise three hours, or until it is double its original size, knead well and mold into loaves, put in greased pans, grease over the top, let rise one hour, when it will again double its size if properly manipulated, then bake."

These methods of making bread are particularly adaptable to hard wheat flours. For soft wheat flours, other methods in which more salt is used, a longer time allowed for fermentation, and a stiffer dough is made, will be found to give better results. Because of differences in the composition of the various kinds of flour, no directions can be given which are alike applicable to all. The method of bread making which is suited to one flour does not necessarily give the best results with other flours. In fact,

it is necessary to vary the conditions of preparation according to the kind of flour used.

HARRY SNYDER,

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Bread-fruit (*Artocarpus incisa*), a tree of the natural order *Urticaceae*, native of the Indian Archipelago and of the southern Pacific Islands. It attains a height of 30 or 40 feet; is often limbless for half its height, bears leathery, glossy dark green, three- to nine-lobed leaves, one to three feet long; has compact, club-shaped, yellow catkins of male flowers, 9 to 15 inches long, and sub-globular heads of female flowers with spongy receptacles; and usually seedless, spheroidal fruits, at first green, later brown, and lastly yellow, six inches or more in diameter, hanging by short thick stalks singly or in clusters of two or three from the smaller branches. The rough rind is irregularly marked in squares and other figures with raised centres. The unripe fruit contains a milky juice, and when in the edible stage it resembles fresh bread, being white and mealy. It is then slightly tart. Later it becomes yellow, juicy, and tastes of decay. In tropical countries where it has been introduced and particularly in its original home, the fruit is highly valued as a nutritious food, being prepared for use in various ways. When baked it resembles plantain rather than wheaten bread, being sweetish, slightly astringent, but otherwise almost tasteless. When fresh fruits cannot be procured, it is sometimes slightly fermented, beaten to a pasty mass, and so used. Another common way of preparing it is to beat it to a paste with coconut milk and to serve it mixed with bananas, plantains, etc. Since the trees produce two or three crops annually, and since the bearing seasons of different varieties overlap more or less, the fruit may be obtained during the greater part of the year. Not alone for the fruit is the tree valuable; in the South Sea Islands its fibrous inner bark is woven into cloth resembling, but inferior in softness and whiteness, to that made from the paper mulberry which is similarly employed in those islands; the gummy exudation from the bark, boiled with coconut oil is used for caulking canoes, pails, etc.; the beautiful yellow wood is light and soft, but when exposed to the air becomes dark like mahogany, and is used for canoes, furniture, and the interior work in houses. The tree has been cultivated to a slight extent in southern Florida, but the fruits rarely appear even in the most southern markets of the United States, because they do not bear shipment well, and unless used very soon after being gathered become hard and disagreeable in taste. For an account of the introduction of the bread-fruit tree into the West Indies in the last decade of the 18th century, when such feats were more difficult and less common than a century later, see Curtis, 'Botanical Magazine' (pp. 286-71). A near relative of the bread-fruit tree is the jaca or jack (q.v.).

Bread Making. See BREAD.

Bread-nut (*Brosimum alicastrum*), a tree of the natural order *Urticaceae*, a native of the West Indies and closely related to the bread-fruit. The tree, which is very large, bears shining lance-shaped leaves; globose catkins of male and female flowers on different trees; and yields a gummy, milky juice from its bark. The round, yellow fruits (drupes), which are about three inches in circumference, contain each a single

BREAD RIOT IN NEW YORK — BREAKWATER

seed. When roasted or boiled they are used like bread, and, having a flavor which resembles hazel nuts, form a pleasant food. In the United States the tree has not been cultivated.

Bread Riot in New York, The, a riotous demonstration in New York, 13 Feb. 1837. The financial policy of President Jackson had created an era of wild-cat banks, currency inflation, extravagant speculation, and high prices which bore cruelly on the poor, flour being \$12 a barrel, partly owing to a short crop the year before, and other prices in proportion. In New York the general distress was intensified by the great fire of 15-16 Dec. 1835, which destroyed nearly 700 business and other buildings, covering some 13 acres in the heart of the city and occasioning a loss of \$20,000,000. For some time the Jacksonian press had been denouncing the grain dealers as the cause of the famine prices, mentioning especially Eli Hart, the leading commission merchant, and the houses of Meech and Herrick, although as they were commission dealers their stocks were obviously not private hoards. On 13 Feb. 1837, just before Jackson's term expired, these papers announced a public meeting in City Hall Park at 4 p.m., the call being headed "Bread, Meat, Rent, Fuel! Their prices must come down!" The call was signed by eight men, two of whom — Moses Jacques and Alexander Ming, Jr. — were well-known and very violent demagogues. Jacques was made chairman, and with Ming, and others, made furious speeches inflaming the passions of the crowd. Some one at length indicated Hart's store, on Washington Street, between Dey and Cortlandt, as a vast hoard of provisions to relieve their distress, and the crowd surged toward it. The police were swept away and beaten, and although two of the three iron doors held, the centre one was battered in, and the crowd began throwing flour barrels and sacks of grain into the street, staving in and tearing open such as did not burst by their own fall, and as one of the papers remarked, "lowering prices by leaving less on the market." A fresh onslaught by the police was repelled; and it was not till well into the evening that a body of militia dispersed the mob, which by this time had thrown into the street about 500 barrels of flour and 1,000 bushels of wheat, the most of it relieving no one. Herrick's stock was somewhat damaged also, and Meech's store attacked. The disturbance was attributed to the foreigners, but although the two ringleaders were foreign, four of the eight names signed to the call were American, and the natives certainly looked on at the mob without trying to assist the officers.

Bread-root (*Psoralea esculenta*), a leguminous plant with edible, farinaceous tubers. It is the *Pomme blanche* or *Pomme de terre* of the French pioneers. It is common on the higher prairies from Texas through Iowa to Wisconsin.

Bread-winners, The, a brief novel, appeared anonymously in 1883. The kindly interest shown by Alfred Farnham, a retired army officer, in Maud Matchin, the handsome but vulgar daughter of a master carpenter in a western city, turns her head, and she confesses her love to him, which is not reciprocated. Maud's rejected lover, Sam Sleeney, journeyman in Matchin's employ, is jealous of

Farnham. Dominated by Offitt, a demagogue, he joins a labor organization. Farnham loves Alice Belding, who refuses him, but still returns his love. During a strike Farnham organizes patrolmen. The mob attacks his house, and Sleeney assaults Farnham, but fails to kill him. Offitt, who now pays his addresses to Maud, enters Farnham's home, assaults and robs him, and Alice and Mrs. Belding come and nurse him. Offitt turns suspicion to Sleeney, hastens to Maud, and urges her to fly with him. Suspecting, she refuses, gets and reveals his secret. Sleeney, who has been arrested, breaks jail, and at Maud's home meets Offitt and kills him. Sleeney is tried for killing Offitt, and acquitted upon the ground of temporary insanity. The book is a brilliant presentation of the conditions of "labor" at that period. Its authorship was acknowledged in 1902 by John Hay.

Breadalbane, bréd-äl'bān, a district in the western part of Perthshire, in the centre of the Grampians, which here cover a large tract of the county in length and breadth. This district is a complete mixture of high and low hills, yielding pasture for large flocks of sheep and shelter for game, with intermediate valleys, some of which are susceptible of cultivation, while others are merely areas of peat and heath. Loch Tay lies in the centre of the district. Kenmore and Killin are the largest villages.

Breadth, a term in art, used to denote means or effects whereby an artist becomes distinguished for largeness and mastery of treatment. Breadth of style in art is shown in work which gives the impression of these qualities, manifested in simplicity, comprehensiveness, and due subordination of detail. In a work of art possessing the true characteristics of breadth, the eye, passing from one feature to another, takes in, as it were, the whole subject and meaning at a single glance.

Break-Circuit Chronometer, the name applied to a box-chronometer to which a device has been attached for breaking an electric circuit at every motion of the escape-wheel, generally every half second.

Break'er. See COAL MINING.

Breakespere, brāk'spēr. See ADRIAN IV.

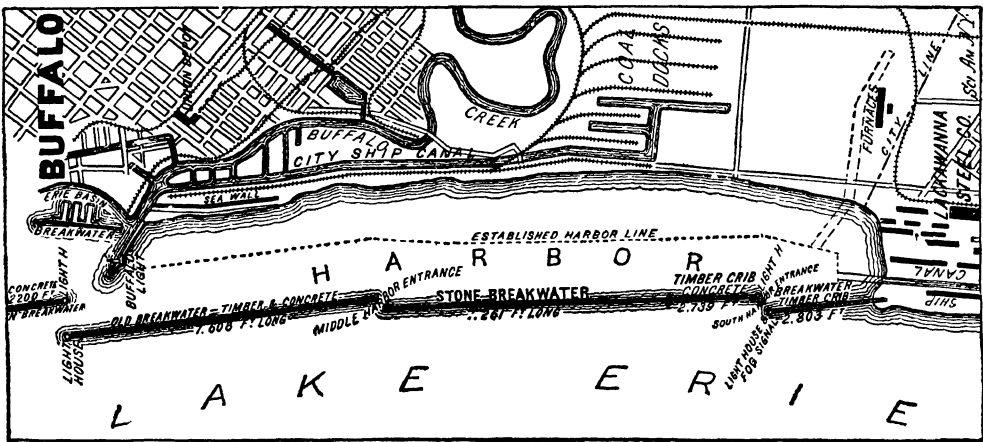
Breaking Bulk, the act of breaking open of a bundle, parcel, etc., and taking the contents, so as to constitute in law a conversion or the like.

Breakwater, an obstruction of any kind raised to oppose the action of the waves, and make safe harbors and roadsteads. The outer mole of the harbor of Civita Vecchia was built by the Emperor Trajan for this purpose; and the piers of ancient Piræus and of Rhodes are of the same class of structures. Herod, it is stated by Josephus, in order to form a port between Dora and Joppa, ordered mighty stones to be cast into the sea in 20 fathoms water, to prepare a foundation; the greater number of them 50 feet in length, 9 feet deep, and 10 feet wide, and some were even larger than these. In the use of such immense blocks of stone, the true principles of constructing a permanent barrier to the waves, appear to have been better understood than they were 17 centuries afterward. Breakwaters are generally solid and made of stone, but there are also floating breakwaters which serve the same purpose. These

BREAKWATER

are built of strong open woodwork, divided into several sections, and secured by chains attached to fixed bodies. The breakers pass between the beams of such a structure as if through a sieve, and in the passage nearly all their force is destroyed. It is estimated that a breakwater of this description will last for 25 years. Stone breakwaters are usually constructed by sinking loads of unwrought stone along the line where they are to be laid, and allowing them to find their angle of repose under the action of the waves. When the mass rises to the surface, or near it, it is surmounted with a pile of masonry, sloped outward in such a manner as will best enable it to resist the action of the waves, or it is covered, as at Plymouth, England, with large blocks of stone, which do not rise high above the surface of the water. Sometimes the breakwater has to be constructed of solid masonry from its foundation. The breakwater at Dover, England, is built in this way, there being no stone in the neighborhood to form a base of the kind described. The most gigantic breakwater ever constructed is that which was erected by French engineers to protect the harbor of Cherbourg. The history of the building of this

base, and 339 feet at the top, the angle of the slope being 60°. This was strengthened by an interior concentric cone, 5 feet 10 inches within the outer one. The frame of each was made of 80 large upright timbers 24 feet long and foot square. On these were erected 80 more of 14 feet in length, making, for the 2 exterior and 2 interior portions, 320 of these uprights. The machine was then planked, hooped, and firmly bolted together. The first cone was built and floated at Havre, then taken to pieces, transported to Cherbourg, and floated off and sunk on 6 June 1784; and the second on 7 July following, in the presence of 10,000 spectators; but before the cavity of this one could be filled with stones, its upper part was demolished in a storm of five days' continuance in August, and the stones it contained were spread over the bottom, interfering with the placing of the next cone. The original plan was to set 90 of these cones, of 150 feet diameter at base, 60 at top, and 65 feet high, in succession, and fill them with loose stones or masonry, and the spaces between them with a network of iron chains, to break the force of the waves. Several modifications of the plan were attempted, the net



breakwater affords an amusing and instructive example of the folly of ignoring experience and the laws of nature. When Louis XVI. appointed commissioners to report upon the best locality for establishing, opposite the English coast, a port and naval arsenal, they recommended the construction of a dike over two miles in length, in water 70 feet deep, in front of the harbor of Cherbourg, by sinking a vast number of ships filled with masonry as a basis, and covering these with heavy stones to within 18 feet of the surface. And when at last four of the ablest naval officers and engineers of France were appointed to execute the work, which was regarded as one of the most stupendous operations, certainly the greatest piece of hydraulic architecture ever undertaken by man, the plan they adopted was one which proved impracticable after having been prosecuted from the year 1784 to 1789, at enormous expense. This plan was the construction of huge truncated cones of timber, which, of the reduced size at which they were actually built, measured 36 feet in height, with a circumference of 472 feet at the

result, after years of labor and an expense of upward of \$6,000,000, being a number of isolated mounds of stone, extending in a crescent for about $2\frac{1}{3}$ miles. In 1830 the work was again taken up, and completed in its present form about 1856. For a full account of this stupendous work, consult Cresy's 'Encyclopædia of Civil Engineering.'

There are many important breakwaters in the United States, and each decade finds an increasing number of them as the demands of trade, and the liberality of the government demands and permits their construction. The latest of these (1903) is the great breakwater at Buffalo, N. Y., built to form a harbor for the immense lake traffic centring at that city. This structure forms the most important section of a long line of breakwaters that extend for $4\frac{1}{2}$ miles along the water-front. At the time that the present work was undertaken there existed the north breakwater, which is built of concrete and extends for 2,200 feet, with a light at its southerly end. Opposite this light and to the westward of it is the northerly end of what is

BREAM — BREARLEY

known as the old breakwater, a timber and concrete structure 7,608 feet long. There is a light at the northerly end of the old breakwater, with a harbor entrance between it and the southerly light of the north breakwater. To the south of the old breakwater is the new structure now being considered. It consists of a stone breakwater 7,261 feet in length, which connects with a timber and concrete structure extending south for another 2,739 feet, with a light at its southerly extremity. Parallel with the previous structure, and slightly to the westward of it, is a timber crib breakwater, 2,803 feet long, which runs northerly from Stony Point. It has a light on its northern extremity, and the opening between this and the last named breakwater forms the south harbor entrance, the opening between the stone breakwater and the old breakwater being known as the middle harbor entrance. The 7,261-foot stretch of the new breakwater is of the rubble mound type, stone-topped, while the southerly end of it, 2,739 feet, is of timber crib construction, to enable vessels to moor alongside of it inside of the harbor.

The new breakwater is built in the open waters of Lake Erie, parallel with the shore, 1,500 feet out from the pierhead line of the harbor, and in 30 feet of water. The first operation was to deposit two parallel ridges of small rubble on the lake bottom, one on the lake side and one on the shore side of the proposed breakwater, the intervening space being filled in with gravel. Another five feet of rubble ridges were added and again filled in with gravel, the mound thus formed being raised to within 10 feet of the surface of the water. The breakwater was then built up for the remaining 10 feet to the surface of the lake by dumping upon it large rubble stones. The slopes of the structure were covered with a revetment of large stones, lowered into place in close touch with each other, so as to completely cover the rubble stone, the object of these heavy quarried stones being to prevent displacement of the rubble by the action of the water. Then came the important work of covering the mound with large capping stones, quarried to prescribed dimensions, many of the stones measuring as much as six feet in thickness. These stones were carried out by five large floating derricks, each with a lifting power of 20 tons. The capping stones were laid snugly together, the finished top and side of the breakwater presenting a fairly even and true appearance. The illustration shows very clearly the way in which the top of the breakwater is finished, the heavy top angle stones serving by their weight and friction to prevent the heavy seas from taking hold of the rubble mound, loosening it and washing it away. A cross section of the breakwater as thus constructed shows it to be normally about 140 feet wide at the bottom and 14 feet wide at the top.

While the masonry breakwater was being constructed, the work of building the timber-crib structure was also going on apace. As compared with the rubble-mound type, the timber and concrete form has the advantage of being cheaper in construction. In building it the first step was to prepare a foundation and for this purpose a powerful clam-shell dredge built especially for the work was used to dredge a trench along the line of the breakwater in the

bottom of the lake 95 feet in width, and 50 feet in depth through the clay. Then through the centre of this trench another excavation was dredged out which was 50 feet in width and extended everywhere to solid rock. The next task was to fill in the trench thus formed with gravel which was brought to the spot in scows and dumped in, a bed of gravel 30 to 40 feet in depth being formed in this way. Upon this was placed an embankment of rubble stone eight feet high, which formed a foundation for the timber cribs. These cribs were built of sawn timber and were 36 feet wide, 22 feet high, and from 60 to 180 feet long. They were towed to position over the foundation and sunk by loading with stone. The superstructure was built in 3 benches, the first 6 feet, the second 10 feet, and the third 12 feet above the mean water level of the lake. Each bench was 12 feet wide. As shown in the illustrations, a certain portion of the crib breakwater, as finished, is of this construction; but the larger portion of it has been capped with concrete. This was done to strengthen the structure, the heavy gales of 12 Sept. and 21 Nov. 1900, in the latter of which the wind reached a velocity of 80 miles an hour, having loosened up and broken the above-water timber coping and finish. In repairing the ravages of the storm, the damaged superstructure was removed and the cribs cut down to an elevation of two feet below the mean lake level. Upon this, concrete blocks, forming longitudinal and cross walls, were placed, and the pockets thus formed filled in with rubble stone, and roofed in with heavy concrete work, which was carried up to the level of the original breakwater. In place of the three benches of the crib superstructure, the reconstructed portion shows a parapet and a banquette. The parapet which is exposed to the lake side covers a width of 27 feet and its crest is 12 feet above mean lake level. The banquette is 8 feet wide and is uniformly 4 feet above the lake level. The new breakwaters have taken some six or seven years to construct, and the cost has been \$2,200,000. Consult: 'Reports of the Chief of Engineers U. S. A.'; Spon, 'Dict. of Engineering'; Stevenson, 'The Construction of Harbors'; De Cordemoy, 'Les portes modernes.'

Bream, a sluggish fresh-water fish (*Abramis brama*) of the carp family, common in European lakes and rivers, and especially numerous in the English fens, where it finds all the conditions most favorable, and reaches a weight of seven or eight pounds. It is edible, but too lethargic to afford sport. Another species (*A. blicca*), is smaller, silvery white, and a favorite with those who enjoy quiet angling. In the United States the term "bream" is given rather indefinitely to several minnows and sunfish; and to various marine fishes, better known as sea-breams (q.v.).

Brearley, William Henry, American journalist and author: b. Plymouth, Mich., 18 July 1846. He served in the Michigan infantry during the Civil War, was connected with several Detroit papers 1870-92; founded the Detroit Museum of Art 1883. He has published 'Recollections of the East Tennessee Campaign'; 'Wanted, a Copyist'; 'Leading Events of the American Revolution.'

BREAST — BREATHING AND HEALTH

Breast, in female animals, a glandular structure, containing vessels for the secretion of milk, and excretory ducts, which open by small orifices in the nipple, and discharge the secreted fluid for the nourishment of the child. At the centre of each breast there is a small projection, the nipple, and this is surrounded by a dark ring termed the areola. The nipple is the part which the infant seizes in its mouth, and through the passage of which the milk flows into the mouth of the child in the act of suction. The glandular structure of the breast is covered by fat, except at the forepart of the nipple and the integument. The breast is liable to many diseases, from irritation during nursing, bruises of the part, undue pressure from tight clothes, and from constitutional causes. Inflammation of the breast is very common during nursing, or from a superabundant secretion of milk. After delivery, the nourishment of the infant being from the breast, there is an increased determination of blood to that part to enable it to perform the necessary function, and thus, when there is any cause of irritation, there is a tendency to increased action in that part, which frequently terminates in inflammation. Lacteal swelling is another troublesome disease of the breast. It is confined to the nipple, and consists of a large collection of milk in one of the lactiferous tubes, the orifice of which has been closed from inflammation. See MAMMARY GLANDS.

Breast-wheel. See WATER-WHEEL.

Breasted, James Henry, American Egyptologist: b. Rockford, Ill., 27 Aug. 1865. He studied at Yale and Berlin, and has been a professor of Egyptology and Semitic languages at the University of Chicago from 1894. He has published 'An English Edition of Erman's Egyptian Grammar' (1898); 'De Hymnis in Solem sub Rege Amenophide IV. Conceptis' (1894); 'A New Chapter in the Life of Thutmose III.' (1900).

Breastplate, a piece of defensive armor covering the breast, originally made of thongs, cords, leather, etc. (hence *lorica*, *cuirass*), but afterward of brass, iron, or other metals. It may be considered as an improvement of the shield or buckler, which was borne on the left arm, and moved so as to protect successively all parts of the body. It being perceived that the free use of both hands in the employment of offensive weapons was important, the defensive armor was attached to the body, and received different names from its position, use, etc., as for instance, breastplate, cuisses, greaves. These different species of defensive armor are of little use against firearms, and have therefore generally fallen into disuse in modern war. (See *CUIRRASS*.) Breastplate, in Jewish antiquity, was a folded piece of rich, embroidered stuff worn by the high-priest. It was set with 12 precious stones bearing the names of the tribes. It was also called the breastplate of judgment, because it contained the Urim and Thummim.

Breastwork, in the military art, every elevation made for protection against the shot of the enemy. Wood and stone are not suitable for breastworks, on account of their liability to splinter. The best are made of earth; in some circumstances, of fascines, dung, gabions, bags of sand, and of wool. The thickness of the

work must be in proportion to the artillery of the enemy. In general it ought not to be less than 10, nor more than 18, or at most 24 feet thick. The rule of Cugnot is, that the breastwork should be so high that nothing but the sky and the tops of trees can be seen within cannon-shot from the interior of the intrenchments. If this rule cannot be followed on account of the height of neighboring mountains, the interior of the fortification ought to be secured by traverses.

Breath (A.S. *bræd*, odor, breath). The ordinary breath has a slight odor, and contains nitrogen, oxygen, carbon dioxide, ammonia, water, and organic impurities. In quiet breathing it probably never carries microbes. In diseases of the mouth, and teeth, nose, throat, lungs and stomach, in constipation, and in fevers the breath may become offensive. Should a simple antiseptic mouthwash or a laxative fail to remove the trouble an underlying disease must be sought out and treated. A suitable mouthwash is Dobell's solution or listerine. Deodorizers, like coffee, cardamon, cloves, etc., may be resorted to for temporary sweetening of the breath, but they have little effect in permanently removing the condition.

Breathing and Health. Essential to continuance of physical being are food, water, and air, and the most important is air. The supply of food may be cut off for days or weeks and life remain in the body. The quality may be poor and amount reduced, and, while it affects health and perhaps reduces strength, life will not go out for a long time. Cut off the supply of air completely for 14 minutes and life becomes extinct. Change from purity of air to that which is only slightly contaminated and in an hour vitality lessens. Headache and nausea appear, and unless there is return to fresh and pure air, disintegration of tissue and physical break-down follow. These facts are patent to all, and are referred to as a starting point to consider how breathing may be used for the establishment and continuance of perfect health. The diseases most dreaded by the medical fraternity are those of a pulmonary nature. They are, in many cases, the result of insufficient air supply and inefficient means of securing it. Diseases affecting digestion follow close upon those relating to the lungs, and these, too, can be regulated by and through breathing. Nervous disorders, likewise, succumb very readily when breathing is properly ordered.

The act of breathing is, then, so important that it should have the attention of every individual. To use it to its best advantage every one must know something of its action and of the parts directly affected by it. There is instinctive breathing and mentally directed breathing. Every one breathes. Instinctive breathing begins at birth and continues through life. If we could always be in fresh air and have little to do we would need no more knowledge of the operation than has any animal. Even for great physical activity instinctive breathing would be sufficient, because every physical exertion would increase the rapidity and breadth of the instinctive act. But we are thinking animals, and we live in conditions requiring more than ordinary physical action. Excitement, nervous movements, high living, and attributes of mind cause us to throw off poisons and gases which the

BREATHING AND HEALTH

breathing apparatus must take care of. To dispose of these we must go beyond instinctive breathing and adopt mentally directed action.

Breath is air taken through the nose and mouth into the lungs, which are elastic sacks made of microscopic vessels suspended on the bronchial tubes in the chest. They expand and collapse as they are acted upon by organs made of muscle. When they expand they draw air into the body; when they collapse they expel air. The muscles which operate them are those of the chest. The chief one is the floor of the chest, called the diaphragm. Those next in importance are the costal muscles, located in the ribs. The next, the dorsal muscles, located in the back. Last, the pectoral muscles in the upper chest in front. The muscles already noted are those which dilate the lungs and draw air into the body. Their action produces inspiration of breath, and that action expands the chest. Their return to normal position permits the collapse of the air-cells of the lungs. Such return is, however, insufficient to cause complete collapse of air-cells and the expulsion of all air. Return is assisted, and expulsion made complete, by calling into use the abdominal muscles and those in the ribs below the diaphragm. It becomes, then, very important to know the location of the diaphragm. This organ is attached in front to the end of the breast bone. One should find this location by pressing with his fingers. Men find it easily because the ribs spread quickly where they leave the breast bone. Women find it less easily as the ribs are close together. But follow up to the point where the very end of the breast bone is located. The diaphragm attaches at the sides to the ribs. One can tell where by placing the hand flat on the side and inhaling a deep breath; that which pushes first against the hand from within is the diaphragm, which is from one to two inches lower than the level of the end of the breast bone. It attaches to the sides all around and into the small of the back, where it is a little lower than at the sides. One should study the location of the diaphragm day after day, until it is definitely fixed in mind. Many who have supposed they knew how and where to take breath by using the diaphragm will find their conception has been that it is lower than it is. The real reason for having the correct location clearly in mind is to avoid desultory and, possibly, harmful practice. The reason for repeating the examination of location so many times is that the mind may go instantly to it in order to direct voluntary inspiration and expiration. Another common error is to suppose the lungs to be located in the upper chest. Ask one if his lungs are sound and he will pound high in front. The largest portion of the lungs is in the sides and back. He pounds over the space occupied by the heart. This common error leads many who practise voluntary breathing into misdirected effort, which is liable to be harmful.

Breathing divides into inspiration and expiration. Inspiration (breath taking) is instinctive and voluntary. The latter is like the former, but it is greatly amplified and extended. Our attention now goes to voluntary inspiration. Its primary physical act is expansion of the diaphragm. Evidence of that is discovered wherever that organ connects with outer parts of the chest, in the generous expansion of those parts, and by quite a little expansion of parts of the body

below the diaphragm. The latter action is caused by the pressure of the centre of the diaphragm (quite in the middle of the body) downward upon the abdominal viscera. Deep breathing, or taking large draughts of air, is always accompanied by generous spread of the body at the level of the diaphragm, and considerable spread of the portion just below that level. Few adults will do this upon the first attempt at mental direction of inhalation, because they have lost the natural habit. If they will study for a few minutes quiet instinctive (not directed) breathing, they will find they really do breathe as described above. But this is not enough for "breathing for health." It must be amplified through mental direction; on the line of instinctive breathing, only much more extensively.

The custom of taking deep breath can be developed into habit in a short time, and it should be used daily. Direct the thought during inhalation to generous expansion of the body in the neighborhood of the diaphragm, and after such expansion has begun, enlarge the sides and back above the diaphragm. Fill the lungs fully, retain the air a few seconds and exhale completely. Such complete exhalation implies that breath shall be forced out by drawing in the abdomen. After repeating the act of inspiration and expiration four or five times, which, by the way, should never be done violently, one can feel the more active rush of blood through the body. This demonstrates that the cleansing process of the circulatory system is accomplishing its work. When a good glow is established refrain from further exercise for the time, but resume it when quietness is again restored. Five or ten minutes given to this practice every morning and evening will, in a month, establish physical strength. Followed through a term of years it will rebuild the body and make it almost invulnerable against the attack of disease. Persons with weak lungs or sluggish circulation can, by this means, become rugged and very active. So far-reaching is the result that great physical strength is acquired. Even the usually expected elements of decay, as manifested in carious teeth and falling hair, are arrested or prevented. The success of all physical treatment lies in the regularity and persistence with which it is followed. In a few weeks or even in one week, the benefit will be observed, but the rebuilding of a body requires persistent practice for a year at least.

Practice of the above nature increases the lung space. Probably no new air-cells can be created, although some authorities claim that there are. The expanding power of existing air-cells is enlarged, and the muscles which cause the expansion greatly increase their power. Such expansion can be measured. It is well to take the bust measure, passing the tape-measure around the body just below the arm pits, and take measurement on the first day of each month thereafter. Comparison with previous measure will show constant increase for a full year. How great an increase to expect depends upon the person. From two to five inches in a year is usual. A more perfect measure of development is given by the spirometer which, as its name implies, is a breath-measure. It records the vital capacity of the lungs. Test measurements in over 500 students proved that every one gained in size of lungs, and many made marvelous changes in their physical condition. The spirometer records the cubic inches of air space

in the lungs. Such capacity varies in accordance with the height, and is greater in men than in women. Tall people have largest lungs, ordinarily, and those who are slim, rather than stout, increase most through practice. Records show that the increase in air capacity in one year averages from 25 to 33 per cent. All this has direct bearing on health. In the lungs the air-cells are surrounded by minute blood vessels. All the blood, after its course through the body, passes to the lungs to discharge its gatherings and to receive the supply of oxygen necessary for life. It is evident that if the air supply is increased 25 per cent, cleansing and oxygenation take place more quickly and more thoroughly. It is recognized among physicians that the purity of the blood is the most important element in keeping well. Meeting the attack of bacilli is the triumph of medical science. The germ of disease is found in the blood, and in modern science inoculation for destroying such germ is the keynote. In the practice of breathing every individual has nature's method of doing what medical science does. It goes beyond that, in that breathing provides prevention as well as cure. The ounce of prevention is the most valuable. Disease germs can hardly find lodgment, and they certainly cannot propagate, in a body which is perfectly well. A feeling of lassitude and "run down" is the admonition which shows that germs are at work. Your doctor tells you to take long walks in the open air. He says in other words that oxygen must be supplied to the lungs. Much surer are we to respond to health-laws if such training as all can have has made the taking of large draughts of air possible.

Above we have described inhalation and exhalation. While we have not sought to formulate a complete system of training, we have given enough to show what may be done. At first, daily practice should be gentle. This will bring into correct use all physical organs which govern breathing. When one realizes ease in action he should make the dual act of inspiration and expiration more generous. Expiration should now be made more complete. That is, make exhalation forceful by drawing in the abdominal muscles and lower ribs greatly. This will also cause broader inspiration. Thus the two sets of muscles will be powerfully increased, and the expanding power of the lungs will be enlarged.

When breath is imbibed in large quantities it should be retained a little time that it may purify the blood. Three or four seconds are long enough at first, but the time may be increased gradually until one can hold it 30 or more seconds. The physical act of holding the breath consists of arresting the inspiratory muscles when they have drawn breath in and refusing to allow them to return to their relaxed position. The very act of thus commanding adds to their strength. It is one of the contributing factors toward strengthening the whole body. The tendency of modern life to greater physical activity accentuates the need of symmetrical development of the lungs and their controlling forces.

FRANK HERBERT TUBBS,
Editor 'Music Life.'

Brébeuf, Jean de, zhôn dè brā-béf, Jesuit missionary: b. Bayeux, France, 25 March 1593; d. 16 March 1649. He set sail in 1625 with Champlain, arrived at Quebec when but a single house was seen there, and fixed his residence

among the Hurons. He learned their language, and gained their confidence. In 1649 they were suddenly attacked by the Iroquois, and Brébeuf fell into the hands of the latter, by whom he was put to death with frightful tortures. His 'Catechism Translated into the Language of the Hurons' was published at Paris in 1652.

Breccia, brĕ'chā, a conglomerate composed of angular pieces of the same or of different rocks, united by a cement or matrix, which, according to its nature, forms the several varieties of calcareous, silicious, etc. The conglomerate known by the name of pudding-stone differs from that of breccia only in having the composing fragments rounded. Calcareous breccia is often found in the form of fine marble, apparently composed of fragments produced by some disrupting force, and then united by the infiltration of carbonate of lime among them. The angular form of the fragments seems to indicate that they have never been exposed to much friction, and have therefore probably originated at no great distance from their present site. In some cases a kind of spurious breccia has been formed by the breaking up of calcareous beds, and their subsequent union by means of infiltration, without any change of their original position. Marble breccia thus formed is remarkable for the size of its fragments. In the calcareous districts of many countries caverns and extensive fissures are seen filled with a reddish mass, composed of lime, sand, and oxide of iron, enclosing angular fragments of different rocks, and a great number of bones more or less broken. To such masses the name of osseous breccia has been given. They are most frequently met with on the shores of the Mediterranean.

Brèche de Roland, brĕsh dè rō-lān, "the breach of Roland," a defile in the Pyrenees, between France and Spain, which, according to a well-known legend, was opened up by Roland, one of the paladins of Charlemagne, with one blow of his sword Durandal, in order to afford a passage to his army. It is an immense gap between the walls of a mountain barrier rising to the height of 9,500 feet above the level of the sea, and from 300 to 600 feet above the bottom of the defile. The defile itself varies in width from 200 to 300 feet. It lies about 43 miles north of Huesca, from which it can at times be seen.

Brechin, brĕh'n, a parliamentary and municipal burgh of Scotland, in Forfarshire, is romantically situated on the left bank of the South Esk, 12½ miles northeast of Forfar, and eight west of Montrose. It is a very ancient royal burgh, and was formerly walled. The chief industry is the manufacture of linens, and the neighborhood exports a considerable quantity of grain. In ancient times there was an abbey of Culdees in this place, and in 1150, when Brechin was constituted an episcopal see by David I., it is supposed that the site of this establishment was that chosen for the foundation of the cathedral. The cathedral church of St. Ninians, which now forms the parish church, is situated on the north edge of a precipitous ravine, which separates the burgh-lands from those of Brechin Castle. The ancient round tower, which is the leading architectural feature of the town, stands at the southwest angle of the church. Such towers are common

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in Ireland, but are seldom seen in Scotland. The Mechanics' Institution is a handsome building, with a beautiful hall, and there is a valuable public library. Pop. (1901) 8,941.

Breck, James Lloyd, American clergyman: b. Philadelphia, 27 June 1818; d. Benicia, Cal., 30 March 1876. He graduated at the University of Pennsylvania in 1838, and at the General Theological Seminary, New York, in 1841. The same year he went to Wisconsin, and aided in the formation of the diocese there in 1847. He was one of the founders of the Nashotah Theological Seminary, remaining as instructor there until 1850, when he went to St. Paul, Minn., as a missionary. There he established an associate mission, and assisted in supplying mission stations for 80 miles around. From 1852 to 1857 he was engaged in missionary work among the Chippewa Indians. In 1858 he established church services at Faribault, Minn., and founded the Seabury Divinity School. He prepared the way for building church institutions there, and was the forerunner of Bishop Whipple. In 1867 Dr. Breck went to Benicia, Cal., where he established church enterprises similar to those at Nashotah and Faribault.

Breck, Samuel, American soldier: b. Middleborough, Mass., 25 Feb. 1834. He is descended from Edward Breck, who came to Dorchester, Mass., from Ashton, England, about 1630. He graduated at West Point 1855, and took part in the Seminole war of 1855-6. During the Civil War he was assistant adjutant-general of McDowell's division, and afterward of the 1st Army Corps, being engaged in the occupation of Fredericksburg and in the Shenandoah Valley expedition, to intercept the retreat of the Confederate forces under Gen. Jackson in 1862. From July 1862 to 1870 he was assistant in the adjutant-general's office at Washington, in charge of rolls, returns, books, blanks and business pertaining to the enlisted men of the regular and volunteer forces, and engaged in the preparation and publication of the 'Volunteer Army Register.' He became brigadier-general and adjutant-general in 1897, and was retired by operation of law, 25 Feb. 1898.

Breck'enridge, Clifton R., American legislator and diplomatist: b. Lexington, Ky., 25 Nov. 1846. He is a son of John Cabell Breckenridge (q.v.), and received a public school education and served in the Confederate army and navy. After the war he attended Washington College (now Washington and Lee University) for three years, and engaged in mercantile business in Pine Bluff, Ark. He was elected to Congress in 1882 as representative-at-large, as a Democrat; was re-elected in 1884, 1886, 1889, 1890, 1892 and 1894, and served on the Committee on Ways and Means during the greater part of his congressional life. He was United States Minister to Russia 1894-7.

Breck'enridge, Hugh Henry, American artist: b. Leesbury, Pa., 1870. In 1892 he was awarded the European scholarship of the Pennsylvania Academy of the Fine Arts, and studied in Paris under Bouguereau, Ferrier, and Doucet. Since 1894 he has been an instructor, and secretary of the faculty in the Pennsylvania Academy of the Fine Arts, and in 1898 organized the Darby School of Painting. His work was

awarded a medal at Atlanta in 1895, and received honorable mention at the Paris Exposition of 1900.

Breckenridge, or Breckinridge, John, American statesman: b. Augusta County, Va., 2 Dec. 1760; d. Lexington, Ky., 14 Dec. 1866. In 1795 he was made attorney-general of the new State of Kentucky, and he served in its legislature from 1797 to 1800. He entered the United States Senate in 1801, becoming four years later attorney-general in Jefferson's cabinet, in which office he died.

Breckenridge, John, American clergyman: b. Cabell's Dale, Ky., 1797; d. 1841. He entered the Presbyterian ministry, and was chaplain of the National House of Representatives, 1810-21. He was pastor at Lexington, Ky., 1823-6, and in Baltimore 1826-31. He was subsequently professor of theology at Princeton Theological Seminary, and was chosen president of Oglethorpe University, Georgia, just prior to his death. He is remembered for a famous theological debate held with Rev. John Hughes, subsequently archbishop of New York, published under the title 'Roman Catholic Controversy' (1836).

Breckenridge, John Cabell, Vice-President of the United States, grandson of John Breckenridge (1760-1806, q.v.): b. near Lexington, Ky., 21 Jan. 1821; d. Lexington, Ky., 17 May 1875. He practised law in Lexington until 1847, when he was chosen major of a volunteer regiment for the Mexican war. He sat in Congress in 1851-5, and in 1856 was elected Vice-President, with James Buchanan as President. In 1860 he was the pro-slavery candidate for the presidency, but was defeated by Abraham Lincoln. A United States senator from March to December 1861, he then entered the Confederate army, was appointed a major-general in 1862, and held some important commands during the Civil War. He was secretary of war in Jefferson Davis' cabinet, at the close of the struggle, and escaped to Europe, whence he returned in 1868, and resumed his law practice.

Breckenridge, Joseph Cabell, American military officer, nephew of John Cabell Breckenridge (q.v.): b. Baltimore, Md., 14 Jan. 1842. He practised law in Danville, Ky., till the beginning of the Civil War, when he joined the Union army. He was made a first lieutenant in the regular army 1863, captain in 1874, brigadier and inspector-general in 1889, and major-general of volunteers, 4 May 1898. He served in the Santiago campaign and had a horse shot from under him.

Breckenridge, Robert Jefferson, Presbyterian clergyman and theological writer, brother of John Breckenridge (1797-1841, q.v.): b. Cabell's Dale, Ky., 8 March 1800; d. 27 Dec. 1871. He was originally a lawyer. He was president of Jefferson College in 1845-7; from 1847 he was pastor at Lexington, Ky. He was an old-school leader in the division of the Presbyterian Church in 1837 into Old and New schools. He was a strong supporter of the Union during the Civil War. His chief works were 'Knowledge of God, Objectively Considered' (1857); 'Knowledge of God, Subjectively Considered' (1859).

Breckenridge, Minn., a village and county-seat of Wilkin County, on the Red River of the North, about 50 miles south of Fargo, North

Dakota. It is reached by the Northern Pacific and Great Northern railroads and is the centre of a very fertile region. It contains flour mills, grain elevators, etc., and steamboats ply between it and the Red River towns in Manitoba. Pop. (1900) 1,282.

Brec'on, or **Brecknockshire**, a county of South Wales, with an area of 719 square miles; pop. (1901) 59,906. It is one of the most mountainous counties of the principality, and presents much bold and magnificent scenery. Near its centre rises the mountain called the Van or Beacon, belonging to the Black Mountains, which traverse its southern portion. It has a height of 2,901 feet, and is the culminating point of South Wales. The river Wye forms a natural boundary between this county and Radnor, and the Usk, rising in the Black Mountains, crosses the county and flows through a fine valley toward the town of Brecon. About two miles east from the latter is Brecknock Mere, one of the largest lakes in South Wales, abounding in otters, pike, tench, perch, and eels. A considerable quantity of agricultural produce is sent to the markets in the neighboring English counties. The chief manufactures are coarse woollens, stockings, and other worsted stuffs; there are also extensive ironworks. Chief towns, Brecon, Builth, Crickhowell, Hay, and Llanelly.

Brecon, or **Brecknock**, the capital of Brecknockshire, stands near its centre, in an open valley at the confluence of the Honddu and Usk, and consists chiefly of three principal and several minor streets. Three bridges span the Honddu and one the Usk. The principal edifices are the county hall, county jail, barracks, Christ's College (an important educational institution on the model of the large public schools), the Independent Theological College, and several of the places of worship. St. John's Church is a fine old building, cruciform, with a massive tower, partly early English, partly in later style. At Brecon the celebrated actress, Mrs. Siddons, was born. Pop. (1901) 5,875.

Breda, **Jan van**, *yān vān brā-dā'*, Flemish painter: b. Antwerp, 1683; d. 1750. He studied at first under his father, who had acquired some reputation, but afterward became a close imitator of Breughel de Velours and Wouvermans, of whose works he made copies, which the most practised eye is scarcely able to distinguish from the originals. He resided several years in England, where he enjoyed a high name, and was much employed by the king and the nobility. On his return in 1725 he was appointed director of the Academy of Antwerp, and was so highly valued by his townsmen that his paintings were often the objects of keen competition.

Breda, a town in Holland, province of North Brabant, 24 miles southwest of Bois-le-duc, on the Merk, being a strong frontier fortress, it was formerly of the greatest importance to Holland, as the chief point of the line of fortresses in front of the Meuse. The fortifications consisted of 15 bastions, as many ravelins, and five horn-works, besides the citadel. These being removed, the chief strength of the place now lies in its marshy environs, which may easily be laid under water. Breda received city rights in 1534; and since that time has often been a subject of contention between the Dutch, Spaniards, and French. It was delivered by treachery into the hands of the Duke of Parma

in 1581, but was retaken by Maurice of Orange in 1590. The latter capture was accomplished by means of a boat loaded with turf, in which 70 Dutch soldiers were concealed. Spinola took Breda in 1625, after a siege of 10 months, but it was retaken by the Dutch under Frederick Henry of Orange, in 1637. During the French Revolutionary War Dumouriez made himself master of the city and fortress in February 1793, and would thereby have prepared the way for the conquest of Holland had he not been forced, by the loss of a battle at Neerwinden, to evacuate the city and fortress, 4 April. In September 1794 Breda was attacked by the army of Pichegru, but did not surrender till all Holland was conquered, in the winter of 1794. On the approach of the Russian vanguard, under Gen. Benkendorf, in December 1813, the French garrison made a sally, and the patriotic citizens, profiting by the occasion, rose *en masse*, shut the gates, and prevented the French from returning into the town. A peace was concluded at Breda between England and Holland in 1667. (Pop. (1899) 26,097.)

Breda, Declaration of. See CHARLES II. OF ENGLAND.

Bredahl, *brā-dāl'*, **Christian Hviid**, Danish poet: b. Hellestrup, 1784; d. 1860. He was educated at the gymnasium and the university of Slagelse. Owing to his love for an out-door life, he turned his attention to agriculture and in 1824 he bought a small piece of land near Sorø, which he cultivated himself. His great work is 'Dramatic Scenes' which was published in six volumes, the first volume appearing in 1819. He also published several polemical works, directed against the Danish romanticism and the realistic writings of the time. In all his works, he shows a love for nature and the natural conditions of life, and a dislike for modern culture; his 'Dramatic Scenes' attacks especially the pride of the nobility and the rule of the priests.

Breden, *brā-dēn*, **Christine** (ADA CHRISTEN). Austrian poet: b. Vienna, 6 March 1844. She was at first an actress, but in 1864 settled in Vienna and began her literary career. In 1873 she married Adalmar Breden, but still used her pseudonym. Her first publication was a collection of poems entitled 'Lieder einer Verlorenen' (1868); her other works include 'Treasures'; 'Our Neighbors'; 'The Virgin Mother, a Story of the Vienna Suburbs' (1892); a novel, 'Ella' (1873); and a drama, 'Faustina' (1871).

Brederode, *brā'dè-rō-dè*, **Hendrick** (COUNT). Dutch patriot: b. 1531; d. 1568. He joined with Counts Egmont and Horn in opposing the tyranny of Cardinal Granvella, the Spanish governor of the Netherlands. In 1566, he presented to Margaret of Parma, who had succeeded Granvella, the famous 'Request,' which gave rise to the insurrection of the *Gueux*, or 'Beggars.' Under the grinding oppression of the Duke of Alva's administration in the Low Countries, he was obliged to retire to Germany.

Brederoo, **Gerbrant Adriaenszoon**, *gār-brānt a'drē-ān-zōn brā-dā'rō*, Dutch dramatist and poet: b. Amsterdam, 16 March 1585; d. there, 8 July 1618. His best poems are 'The Meditative Song Book' and 'The Great Fountain of Love,' collections of grave and gay pieces, all of which have been very popular, and

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since his time often reprinted. His lyrics are admired for their musical verse and their tender sensibility; but his masterpiece is unquestionably the 'Jerolimo' ('Spaansche Brabander Jerolimo'), a comedy based upon a French version of one of Mendoza's plays. Another comedy, 'Moortje,' is an adaptation from Terence. See Ten Brink, 'Gerbrand Adriaenszoon Brederoo' (1859).

Bredow, Gabriel Gottfried, gǎ'brī-əl gōt'-frēd brā'dō, German historian: b. Berlin, 14 Dec. 1773; d. Breslau, 5 Sept. 1814. He was for a time professor at Eutin, and a colleague of the celebrated Voss; afterward professor at Helmstadt, and still later at Frankfurt-on-the-Oder, whence he went to Breslau on the removal of the university to that place. He was distinguished for his patriotism and his literary works. His 'Handbuch der alten Geschichte' (Manual of Ancient History) passed through five editions, the fifth of which appeared in 1825. He was the author of 'Chronik des Neunzehnten Jahrhunderts' (Chronicle of the 19th Century); 'Epistolæ Parisienses'; 'Untersuchungen über Geschichte, Geographie, und Chronologie' (Researches in History, Geography, and Chronology); and of the very useful 'Historische Tabellen' (Historical Tables), which were translated into English.

Brée, brā, Matthæus Ignatius van, Belgian painter: b. Antwerp, 1773; d. there, 1839. He chiefly excelled in historical painting, for which he gained a prize in 1797. His characteristics are said to have been originality and vigor of conception and patience in execution, yet he worked with great rapidity, as he presented to Napoleon in a few hours a tableau of the manoeuvres of the fleet on the Scheldt before Antwerp. His first work which attracted attention was the 'Death of Cato.' Among his principal works are 'Rubens Dictating his Dying Testament'; 'The Tomb of Nero at Rome, with a group of Itinerant Musicians and Lazzaroni'; 'Death of Count Egmont'; 'Van der Werff Addressing the Famished Populace During the Siege of Leyden in 1576'—the burgo-master is represented as saying, "Take my body and divide it amongst you." Van Brée had the title of painter to the Empress Josephine, and represented many scenes connected with the French occupation of Belgium. He replaced Herreyns as director of the Academy of Fine Arts at Antwerp, and gained a high reputation by his teaching. He also evinced a capacity to excel in sculpture and lithography.

Breech and Breech-loader. The breech of a gun is that portion of a gun immediately behind the bore, and which in modern small-arms and artillery is removed to enable the process of loading to be effected. The chief advantages of this method, over muzzle-loading, are that it greatly increases the quick-firing capacity of the weapon, and adds to the length of range and accuracy of aim, while affording much facility for cleaning. Though it has only been successfully adopted in quite modern times, the breech-loading principle is nothing new, as some of the earliest cannon were so constructed. The first weapon of this description utilized as a regular military arm was the needle-gun adopted by the Prussian government so long ago as 1841, though its efficacy and superiority for warlike purposes was not demonstrated till the success-

ful campaigns of Prussia against Denmark and Austria in 1864 and 1866. Other nations also speedily armed their troops with breech-loading rifles, the French having adopted the Chassepôt breech-loader in 1866, and in Britain the old Enfield rifle having been converted into a breech-loading weapon and supplied to the troops the same year. In 1871 the Snider or converted Enfield began to be superseded by the Martini-Henry rifle, and this again has been superseded in the British army by the Lee-Metford magazine rifle. Other European nations have also adopted different forms of breech-loading rifles. The principle of breech-loading has also been applied to artillery, the names of Armstrong and Krupp being associated with some of the first modern guns of this type. See ARTILLERY; GUN; MUSKET; RIFLE; etc.

Breeches, a garment for the legs, especially, as distinguished from trousers, for covering the upper portions of the legs. In England they were formerly called hose. Breeches or hose were in use even among the ancient Babylonians, and with them were made so as to cover the foot and supply the place of stockings. In Europe we find hose first used among the Gauls, hence the Romans called a part of Gaul breeched Gaul (*Gallia braccata*). In the 5th century they had become fashionable in Rome. In the time of Queen Elizabeth and James I. the breeches had assumed enormous dimensions, being stuffed out with various materials, as wool, hair, etc. King James' partiality for such breeches is well known, and we find him represented in an old engraving with wide stuffed breeches tapering to the knee, slashed and adorned with lace. In the reign of Charles I. they took the form of short trousers, loose at the knee, and ornamented with ribbons, lace, etc. In the time of William III. the tight knee-breeches came in, and have been supplanted by trousers only in the 19th century.

Breeches Bible, a name given to a Bible printed in 1579; and so called from the reading of Gen. iii. 7: "They sowed figge tree leaves together and made themselves breeches." As a matter of fact this Bible has no more distinctive right to the name than Wyclif's version, in which the same words are also found.

Breeches Buoy. See LIFE SAVING SERVICE.

Breeching, a rope used to secure the cannon of a ship of war, and prevent them from recoiling too much in the time of battle. It is of sufficient length to allow the muzzle of the cannon to come within the ship's side to be charged.

Breede, brā'dē, a river in Cape Colony, which rises in the Warm-Bokkeveld, and flows chiefly in a southeasterly direction through the district of Zwellendam, entering the Indian Ocean at St. Sebastian's Bay, about 60 miles northeast of Cape Agulhas, the most southerly point of Africa. It is navigable for vessels drawing not more than 10 feet of water to a distance of 40 miles, and drains a very fertile district.

Breeding, the process of procreation as applied to any or all classes of organisms. In this article the term is largely used to describe the breeding of domesticated animals. Originally the different variatations of types or breeds had their origin in the accident of circumstance

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and the natural tendency of all animal life toward variation; but since man began to exercise control, and to appropriate various breeds or types to his own use, reproduction has been almost entirely along the lines of natural and artificial selection. Thus we may very properly limit the definition of breeding as discussed in this article to the art by which domestic breeds are obtained. Probably the best-known as well as the most ancient maxim of "breeding," and one which has been expressed in one form or another by every ancient writer on husbandry and agriculture of which there is any record, is the familiar aphorism that "like produces like." A natural result of this was the practice of breeding from the best type-specimens. There does not seem at first to have been any consistent system of selection, and as the standard of excellence varied with the passing periods there was no real progress in breed-development, as we understand it to-day. About the middle of the 18th century Robert Bakewell, an Englishman, originated a system of breeding live stock based upon the idea that the principle of "like begetting like" went much farther than the general similarity of the offspring to the parents, and extended to the minutest details of the organization. He made a special study of the form and proportions of animals, and formulated a definite standard of excellence representing the form and internal qualities that he desired to obtain. This standard governed his actions when making selections for breeding purposes. He succeeded so far in molding the plastic forms of the cattle upon which he experimented as to arouse the interest of other breeders, with the result that to-day there are many varieties of improved breeds, all of them of remarkable excellence, but each differing from the others in the characteristics that have been bred into them, to adapt them to special purposes or conditions of environment.

Heredity in Breeding.—There is good reason to believe that not only the external characteristics of the parents are reproduced in the offspring, but that internal structure and functional activity, and in fact every peculiarity of the organization of the parents are also transmitted. Innumerable illustrations from every department of organic life confirm this theory, and if further proof be needed, the hereditary transmission or predisposition to disease will supply it. For instance, it sometimes happens that mares affected with such diseases as ringbone, navicular disease, etc., in consequence of which they are unfitted for work but are kept as breeders, have colts in which are combined all the good qualities of the parents, but which at the age of five or six years develop diseases similar to those of the disabled parents. Not only are the hereditary characteristics of conformation, temperament, and disease transmitted, but frequently also, the habits and characteristics which have been developed by special conditions of environment, or because of some particular training they have received from man. Illustrations of this may be found in the tendency of well-bred short-horns to mature early and acquire fat rapidly; and the ability of Jerseys and other dairy breeds to secrete a large supply of milk. With the horse, the English thoroughbred racer and the American trotter furnish the most convincing illustrations of what breeders consider the transmission of acquired

characters. It is the various breeds of dogs, however, that form the best examples. It is a common experience of the hunter to discover a setter, pointer, or retriever that has never been "shot over" before, but which "works" with as much skill and steadiness as the most experienced sporting dog. The transmission of *abnormal characteristics of structural conformation* is another fruitful source of the variation of types, as for instance the Dorking fowls, whose characteristic of a fifth toe has been inherited, it is claimed, from a five-toed fowl brought to Britain by the Romans. Similar instances of the working of this law may be found in abundance in every branch of organic life. It does not follow, however, that the immediate offspring of a parent marked by some abnormalism will develop the same characteristic; but that it will make its reappearance in some subsequent generation is an indisputable fact. This phenomenon is technically known as "atavism" (q.v.), but it is more generally described as "throwing-back," "breeding-back," etc. Instances of characteristics that have been extinct for half a century, but which reappear with all the peculiarities of the original breed are in the experience of every breeder. In brief, an offspring may unite in itself the prominent characteristic of one or both parents, or it may resemble a grandparent, or even a remote ancestor; but it is equally the offspring of all its ancestors and, within its own organization in a latent condition are the characteristics of all preceding generations, any one of which may be duplicated in its own offspring. It is at this point that the "law of co-relation" asserts itself, which Miles in his 'Stock Breeding' defines as "any peculiarity in the development of one organ or set of organs, usually accompanied by a corresponding modification or suppression of organs belonging to some other part of the system." With regard to domestic animals, whose flexibility or plasticity of organization is perhaps greater than other animals, we find that the principal causes of animal variation are climate, food, and habit, and that the distinguishing characteristics of the different breeds have been the result of the modifying influences of the environment to which they have been subjected. Thus the small breeds of sheep and cattle in mountainous countries are in decided contrast to those of the same species obtaining their food-supply in the lowlands or fertile valleys. Indeed the relation of the size of animals to their food-supply has been commented upon by writers from the earliest times.

The function of reproduction in the animal organization is also affected by the conditions above mentioned. The procreative ability of many wild species becomes weak or extinct if the animals are subjected to confinement; yet in direct contrast to this we find domesticated varieties more prolific than the wild species—for example, tame ducks deposit more eggs than wild ones; and the same fact is true of dogs, swine, rabbits, pigeons, etc. All authorities are agreed that this greater fecundity is due to the better food-supply and the security generally of domestic conditions. It has been observed that throughout the entire animal kingdom the smaller species of animals are more prolific than the larger ones, and certain it is that they breed at an earlier age, at shorter intervals, and have a greater number of young at each birth.

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Breeding from close affinities is known as "in-and-in breeding," the best definition of which is that of Randall, 'Practical Shepherd,' "breeding between relatives, without reference to degree of consanguinity." Possibly no other practice in breeding has been fought over so much as that of "in-and-in" breeding. The opponents of the practice assert that the offspring of closely related parents are born with a predisposition to disease, and that in any event they will suffer from a lack of fecundity. Before going farther into this question, it will be well to state that while high-breeding implies the breeding from animals within the family limits, yet all high-bred animals are not necessarily "in-and-in" bred, although they must be closely bred to a greater or less extent. When a breeder wished to secure a type representing the highest standard of excellence, he has found it necessary to select animals for breeding-stock that possessed the characters he wished to reproduce in the offspring. It followed, therefore, seeing that it is only animals descended from a common ancestor, and having the same hereditary tendencies that possess the desired variations, he was usually compelled to breed together animals that were more or less closely related. No matter how right or how wrong the practice of "in-and-in" breeding may be, it is an indisputable fact that all the successful breeders have practised it more or less in order to retain and fix in their animals the desired tendencies and characters. The most cursory examination of herd-books and breeding-registers will show how closely related all the most valuable animals have been to each other. What may be considered to be the opposite of "in-and-in" breeding, is the practice of pairing together animals belonging to distinct breeds. This is known technically as "cross-breeding." It frequently happens that the offspring of a first-cross between distinct species possess very desirable qualities, but their sterility prevents the formation of a new or intermediate race, so that the cross has to be repeated to secure another such offspring. The mule is the most familiar example of such a cross. Cross-bred cattle while not sterile as is the case with mules, are yet incapable of transmitting their good qualities to their offspring.

The period of gestation in all mammals is determined by causes yet unknown. That it would seem to have some relation to the size of the animal may be gathered from the following examples: Elephant, 20 to 23 months; giraffe, 14 months; dromedary, 12 months; the different varieties of buffalo, from 10 to 12 months; ass, 12 months; mare, 11 months; cow, 285 days; bear, 6 months; reindeer, 8 months; monkey, 7 months; sheep and goat, 5 months; sow, 4 months; beaver, 4 months; lion, 108 days; dog, fox, and wolf, 62 days; cat, 50 days; rabbits, 30 days; squirrel and rat, 28 days; guinea pig, 21 days. The same rule may be traced in the periods of incubation in birds.

To sum up, the art of breeding consists in the exercise of judgment and skill in the matter of selection. The parents must be chosen in accordance with some well-defined purpose and for the conditions under which they will be placed. High-bred males have been found to impress their own good points upon their offspring, more than do high-bred females. In the opinion of many successful breeders, the dan-

gers of "in-and-in" breeding are considerably lessened when a high-bred sire, rather than an inferior animal, is employed. Miles, 'Stock-Breeding,' lays down the rule that "in the improvement of grades as well as pure-bred animals, the selection of breeding-stock must go hand in hand with a judicious system of feeding and management, as the artificial characters which are impressed by the male upon his offspring can only be retained through the influence of essentially the same conditions that originally produced them."

Breeding, Plant. The fundamental principles of plant breeding are simple and may be stated in few words; the practical application of these principles demands the highest and most refined efforts of which the mind of man is capable, and no line of mental effort promises more for the elevation, advancement, prosperity, and happiness of the whole human race. Every plant, animal, and planet occupies its place in the order of nature by the action of two forces—the inherent constitutional life force with all its acquired habits, the sum of which is hereditary; and the numerous complicated external forces or environment. To guide the interaction of these two forces, both of which are only different expressions of the one eternal force, is, and must be, the sole object of the breeder, whether of plants or animals. When we look about us on the plants inhabiting the earth with ourselves and watch any species day by day, we are unable to see any change in some of them. During a lifetime, and in some cases perhaps including the full breadth of human history, no remarkable change seems to have occurred. And yet there is not to-day one plant species which has not undergone great and to a certain extent constant change. The life forces of the plant in endeavoring to harmonize and adapt the action of its acquired tendencies to its surroundings may, through many generations, slowly adapt themselves to the necessities of existence; yet these accrued forces may also produce sudden and, to one not acquainted with its past history, most surprising and unaccountable changes of character. The very existence of the higher orders of plants now inhabiting the earth has been secured to them only by their power of adaptation to crossings, for through the variations produced by the combination of numerous tendencies, individuals are produced which are better endowed to meet the prevailing conditions of life. Thus, to nature's persistence in crossing we owe all that earth now produces in man, animals, or plants; and this magnificently stupendous fact may also be safely carried into the domains of chemistry as well, for what is common air and water but nature's earlier efforts in that line, and our nourishing foods but the result of myriad complex chemical affinities of later date.

Natural and artificial crossing and hybridizing are among the principal remote causes of nearly all otherwise perplexing or unaccountable sports and strange modifications, and also of many of the now well-established species. Variations without immediate antecedent crossing occur always and everywhere from a combination of past crossings, and environments for potential adaptations often exist through generations without becoming actual, and when we fully grasp these facts there is nothing mysterious in the sudden appearance of sports; but

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still further intelligent crossings produce more immediate results and of great value, not to the plant in its struggle with natural forces, but to man, by conserving and guiding its life forces to supply him with food, clothing and innumerable other luxuries and necessities. Plant life is so common that one rarely stops to think how utterly dependent we are upon the quiet but magnificently powerful work which plants are constantly performing for us. It was once thought that plants varied within the so-called species but very little, and that true species never varied. We have more lately discovered that no two plants are exactly alike, each one having its own individuality, and that new varieties having endowments of priceless value and even distinct new species can be produced by the plant breeder with the same precision that machinery for locomotion and other useful purposes is produced by the mechanic. The evolution and all the variations of plants are simply the means which they employ in adjusting themselves to external conditions; each plant strives to adapt itself to environment with as little demand upon its forces as possible and still keep up in the race. The best endowed species and individuals win the prize, and by variation as well as persistence. The constantly varying external forces to which all life is everywhere subjected demand that the inherent internal force shall always be ready to adapt itself or perish. The combination and interaction of these innumerable forces embraced in heredity and environment have given us all our bewildering species, none of which ever did or ever will remain constant, for the inherent life force must be pliable or outside forces will sooner or later extinguish it. Thus, adaptability as well as perseverance is one of the prime virtues in plant as in human life. Plant breeding is the intelligent application of the forces of the human mind in guiding the inherent life forces into useful directions by crossing to make perturbations or variations of these forces and by radically changing environments, both of which produce somewhat similar results, thus giving a broader field for selection, which, again, is simply the persistent application of mental force to guide and fix the perturbed forces in the desired channels. Plant breeding is in its earliest infancy. Its possibilities, and even its fundamental principles, are understood but by few. In the past it has been mostly dabbling with tremendous forces which have been only partially appreciated, and has yet to approach the precision which we expect in the handling of steam or electricity; and notwithstanding the occasional sneers of the ignorant, these silent forces embodied in plant life have yet a part to play in the regeneration of the race which, by comparison, will dwarf into insignificance the services which steam and electricity have so far given. Even unconscious or half conscious plant breeding has been one of the greatest forces in the elevation of the race. The chemist and the mechanic have, so to speak, domesticated some of the forces of nature, but the plant breeder is now learning to guide even the creative forces into new and useful channels. This knowledge is a most priceless legacy, making clear the way for some of the greatest benefits which man has ever received from any source by the study of nature. A general knowledge of the relations

and affinities of plants will not be a sufficient equipment for the successful plant breeder. He must be a skilful botanist and biologist, and, having a definite plan, must be able to correctly estimate the action of the two fundamental forces—inherent and external—which he would guide.

The main object of crossing genera, species or varieties is to combine various individual tendencies, thus producing a state of perturbation or partial antagonism by which these tendencies are, in later generations, dissociated and recombined in new proportions, which gives the breeder a wider field for selection. But this opens a much more difficult one,—the selection and fixing of the desired new types from the mass of heterogeneous tendencies produced,—for by crossing, bad traits, as well as good, are always brought forth. The results now secured by the breeder will be in proportion to the accuracy and intensity of selection and the length of time they are applied. By these means the best grains, fruits, nuts, and flowers are capable of still further improvement in ways which to the thoughtless, often seem unnecessary, irrelevant or impossible. When we capture and domesticate the various plants, the life forces are relieved from many of the hardships of an unprotected wild condition, and have more leisure, so to speak, or, in other words, more surplus force to be guided by the hand of man under the new environments into all the useful and beautiful new forms which are constantly appearing under cultivation, crossing and selection. Some plants are very much more pliable than others, as the breeder soon learns. Plants having numerous representatives in various parts of the earth generally possess this adaptability in a much higher degree than the monotypic species, for, having been subjected to great variations of soil, climate and other influences, their continued existence has been secured only by the inherited habits which adaptation demanded; while the monotypic species, not being able to fit themselves for their surroundings without a too radical expensive change, have only continued to exist under certain special conditions. Thus, two important advantages are secured to the breeder who selects from the genera having numerous species—the advantage of naturally acquired pliability, and in the numerous species to work upon by combination for still further variations. The plant breeder, before making combinations, should with great care select the individual plants which seem best adapted to his purpose, as by this course many years of experiment and much needless expense will be avoided. The difference in the individuals which the plant breeder has to work upon are sometimes extremely slight. The ordinary unpractised person cannot, by any possibility, discover the exceedingly minute variations in form, size, color, fragrance, precocity and a thousand other characters which the practised breeder perceives by a lightning-like glance. The work is not easy, requiring an exceedingly keen perception of minute differences, great practice and extreme care in treating the organisms operated upon; and even with all the naturally acquired variations added to those secured by crossing and numerous other means, the careful accumulation of slight individual differences through many generations is imperative, after which sev-

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eral generations are often but not always necessary to thoroughly "fix" the desired type for all practical purposes.

The above applies to annuals or those plants generally reproduced by seed. The breeder of plants which can be reproduced by division has great advantage, for any individual variation can be multiplied to any extent desired without the extreme care necessary in fixing by lineal breeding the one which must be reproduced by seed. But even in breeding perennials the first deviations from the original form are often almost unappreciable to the perception, but by accumulating the most minute differences through many generations the deviation from the original form is often astounding. Thus, by careful and intelligent breeding any peculiarity may be made permanent, and valid new species are at times produced by the art of the breeder, and there is no known limit to the improvement of plants by education, breeding, and selection.

The plant breeder is an explorer into the infinite. He will have "no time to make money," and his castle,—the brain,—must be clear and alert in throwing aside fossil ideas and rapidly replacing them with living, throbbing thought, followed by action. Then, and not until then, shall he create marvels of beauty and value in new expressions of materialized force, for everything of value must be produced by the intelligent application of the forces of nature which are always awaiting our commands. The vast possibilities of plant breeding can hardly be estimated. It would not be difficult for one man to breed a new rye, wheat, barley, oats, or rice which would produce one grain more to each head, or a corn which would produce an extra kernel to each ear, another potato to each plant, or an apple, plum, orange, or nut to each tree. What would be the result! In five staples only in the United States alone the inexhaustible forces of nature would produce annually without effort and without cost:

15,000,000	extra bushels of wheat,
5,200,000	extra bushels of corn,
20,000,000	extra bushels of oats,
1,500,000	extra bushels of barley,
21,000,000	extra bushels of potatoes,

But these vast possibilities are not alone for one year, or for our own time or race, but are beneficent legacies for every man, woman, or child who shall ever inhabit the earth. And who can estimate the elevating and refining influences and moral value of flowers with all their graceful forms and bewitching shades and combinations for color and exquisitely varied perfumes? These silent influences are unconsciously felt even by those who do not appreciate them consciously, and thus with better and still better fruits, nuts, grains, and flowers will the earth be transformed and man's thoughts turned from the base destructive forces into the nobler productive ones, which will lift him to higher planes of action toward that happy day when man shall offer his brother man not bullets and bayonets, but richer grains, better fruits, and fairer flowers. Cultivation and care may help plants to do better work temporarily, but by breeding plants may be brought into existence which will do better work always, in all places and for all time. Plants are to be produced which will perform their appointed work better, quicker, and with the utmost precision. Science sees better grains, nuts, fruits,

and vegetables all in new forms, sizes, colors, and flavors, with more nutrients and less waste, and with every injurious and poisonous quality eliminated, and with power to resist sun, wind, rain, frost, and destructive fungus, and insect pests; fruits without stones, seeds or spines; better fibre, coffee, tea, spices, rubber, oil, paper and timber trees, and sugar, starch, color, and perfume plants. Every one of these and ten thousand more are within the reach of the most ordinary skill in plant breeding. Man is slowly learning that he, too, may guide the same forces which have been through all the ages performing this beneficent work which he sees everywhere, above, beneath, and around him in the vast teeming animal and plant life of the world.

LUTHER BURBANK.

Breed's Hill, a slight elevation in the Charlestown district of Boston, Mass., about 700 yards from Bunker Hill. Although the famous engagement of 17 June 1775 is known as the Battle of Bunker Hill, the fighting was done on Breed's Hill. Here was located the American redoubt, against which the British made their three historic charges, and here Warren fell. The Bunker Hill monument stands on Breed's Hill.

Breese, Kidder Randolph, American naval officer: b. Philadelphia, 14 April 1831. He entered the navy in 1846 and served in the Civil War. In 1861 he commanded the third division of Porter's mortar flotilla in the attacks on New Orleans and Vicksburg; in 1863 and 1864 he was lieutenant commander on the Mississippi and took part in the most important engagements; in 1865 he was fleet-captain at the attack on Fort Fisher. He was made captain in 1874.

Breeze-fly. See BOT-FLY.

Brefeld, Oskar, ös'kär brä'fält, German botanist: b. Telgte, Westphalia, 19 Aug. 1839. He was educated at Halle, Munich, and Würzburg. In 1875 he was a lecturer at Berlin; in 1878 he became professor at Eberswald, in 1884 at Munster, and in 1898 at Breslau. His investigations have been chiefly in mycology and he introduced a number of new methods in the study of this science, particularly the use of "gelatine cultures." He has written 'Researches in the Field of Mycology.'

Bregenz, brā-gēnts' (Latin, *Brigantium*), a town of Austria-Hungary, in Vorarlberg, 77 miles west by north of Innsbruck. It occupies a beautiful site on a slope which rises from the Lake of Constance and terminates on Mount Gebbard, where the ruins of the ancient stronghold of the Counts of Montfort are still seen. It consists of an old town, very poorly built, and a modern, which is more attractive. Among its edifices are three churches and two monasteries, a town hall, and a museum of Roman antiquities, found in the vicinity. Its chief manufacture is framework and other wooden fittings for houses, and it trades in corn, fruit, wine, butter, and cattle. There are saltpetre works, blast furnaces, and coal mines in the vicinity. Pop. (1900) 7,600.

Bregma. In the infant, a little behind the forehead in the middle line of the skull there is a diamond-shaped opening where the bones have not yet closed together. This situation is known as "bregma" and is taken as a landmark in medical and anthropological measurements.

BREHON — BREMEN

Bre'hon (Irish, *breitheamh*, a judge), an ancient magistrate among the Irish. These magistrates seem to have been hereditary, and before the introduction of Christianity probably combined the offices of judge and priest. They administered justice to their respective tribes — each tribe had one brehon — seated in the open air upon some sods placed on a hill or eminence. The poet Spencer, in his 'View of the State of Ireland,' refers to the Brehon law as an unwritten code handed down by tradition. He was, however, mistaken in regarding it as an unwritten code. Patriarchal as was the administration of the Brehon law, its transmission was not left to tradition. In the earliest manuscripts extant it is said to have been revised by St. Patrick and other learned men, who expunged from it the traces of heathenism, and formed it into a code called the *Senchus Mor*, about 440, and it is implied that a previous written code existed. The Brehon law was exclusively in force in Ireland until 1170. Various ineffectual attempts were made by the English government to suppress it, and it was finally abolished by James I. in 1605. The Brehon laws, like other laws passed at the same period of European history, contained, with some rude principles of justice, many barbarous institutions. The state of society indicated in them seems to be a sort of transition from the communal ownership and periodical repartition of the land, found among several Teutonic nations, to a manorial organization. Several distinct social ranks are indicated, ranging from the nobles to the serfs. They had regular courts, with the right of appeal from lower to higher ones. Most offenses, even including murder, could be commuted by fines, which were fixed with minute precision; but the fines were paid in kind, since coined money was unknown. The laws also carefully provide for and regulate the raising of the children of the upper classes by members of the subordinate classes. The marriage laws were of a very loose character, and the law of inheritance is obscure and complicated. Until recently these laws have been involved in great obscurity. A commission was appointed in 1852 to superintend the publication and translation of the ancient laws of Ireland; and between 1865 and 1885 an edition of the *Senchus Mor* was published in five volumes. See Maine, 'Early History of Institutions' (1875).

Breisach, *brī-zāh*, or **Alt Breisach**, a town of Baden, on an isolated basalt hill (804 feet) on the right side of the Rhine, 14 miles west of Freiburg. The Mons Brisiacus of Cæsar, it was taken by Ariovistus when he invaded Gaul; being regarded as the key to western Germany, it figured prominently in the wars of the 17th and 18th centuries. The minster is a 13th century structure. It carries on an active trade in lumber and cattle, and manufactures beer, wall paper, wine, etc. Pop. (1900) 3,500.

Breitbach, *brī'tbāh*, **Karl**, German painter: b. Berlin, 14 May 1833. He was educated at the Berlin Academy and in Paris under Couture. He first devoted himself to landscape painting, but later became both a genre and a portrait painter. Among his works are: 'Mill of St. Quen near Paris'; 'The Trianon Park'; 'Sunrise in the Bavarian Highlands'; 'Kirmess — Joy'; 'Kirmess — Sorrow'; 'Village Children

Bathing'; 'At the Fortune Teller's'; and portraits of Weber and others. He has also painted interior decorations.

Breitenfeld, *brī'tēn-fēlt*, a village of Saxony, four miles north of Leipsic. Here two battles were gained by the Swedes during the Thirty Years' War. In the first, fought on 7 Sept. 1631, Gustavus Adolphus, joined by the Saxons, defeated Tilly and Pappenheim; in the second, on 2 Nov. 1642, Torstenson, who had succeeded on the death of Baner to the command of the Swedish army in Germany, again defeated the Imperialists under the Archduke Leopold and Piccolomini, who had advanced to the relief of Leipsic, invested by the Swedes. Leipsic surrendered after the battle. Breitenfeld was also the scene of a portion of the battle of Leipsic, won by the allies against Napoleon, 16-19 Oct. 1813.

Breitkopf, Johann Gottlob Immanuel, *yō'hān gōt'lōb īm-mān'oo-əl brī't'kōpf*, German printer and publisher: b. Leipsic, 1719; d. 1794. He was educated in the university of his native city, and following out a scientific study of printing, he evolved improvements in musical notation and in German text. To him is probably due the present form of modern printed music. In 1764 he established in Leipsic the publishing house known as Breitkopf and Härtel from 1795. He was the author of 'Ueber die Geschichte der Erfindung der Buchdrucker-kunst' (1779); 'Ueber den Druck der Geographischen Karten' (1777-9).

Breitman, Hans, *hānts brī't'mān*. See **LELAND**, CHARLES GODFREY.

Brekelenkam, *brā-kē-lēn'kām*, **Quirin**, Dutch painter: b. Zwammerdam, near Leyden, about 1620; d. Leyden, 1668. He was to some extent an imitator of Dou, and perhaps his pupil. His subjects are from the life of the people, and his treatment marked by fidelity to nature and breadth of style. Among his most characteristic paintings are: 'The Fireside'; 'Monk Writing'; 'Interior'; 'The Sandwich'; 'Game of Cards'; and 'A Brazier.'

Bremen, *brā'mēn*, a port and free city of Germany, and an independent member of the empire, one of the three Hanse towns, is situated on the Weser, about 50 miles from its mouth, in its own small territory of 98 square miles, besides which it possesses the town and port of Bremerhaven at the mouth of the river. The town is divided into the old town (Altstadt), on the right bank of the river; the new town (Neustadt), on the left bank of the river, and the extensive suburbs (Vorstädte). The first is separated from the suburban quarters adjoining by the ramparts of the city, now converted into walks and pleasure-grounds, and forms a sort of semicircle on the right bank of the river. The new town lies on the left bank of the river opposite the old, with which it is connected by three bridges, two of them crossing the main stream, and the third crossing an arm of it called the Little Weser, besides a railway bridge. Extensive suburbs lie on this side also. The streets of the old town are generally narrow and crooked, and lined with antique houses in the style of the Middle Ages. This is the business quarter of the city, and contains the chief public buildings, including the cathedral, the old Gothic council-house, with the famous wine

cellar below it, the modern town-hall, the Schutting or merchants'-house, the old and the new exchange, etc. The new town has straight, well-built streets, lined mostly with dwelling-houses and shops. The suburbs also consist chiefly of dwelling-houses, and as these often have gardens in front, the streets have a very pleasant aspect. The chief ecclesiastical building is the cathedral, a Romanesque edifice, founded in 1044, subsequently added to at various times, and in 1888-93 provided with two new western towers. There are several other old and interesting churches, as those of St. Ansgar, St. Stephen, and St. John. Among buildings of recent erection are the court-house, savings bank, and railway station. There are several squares and open spaces, and besides the pleasure-grounds formed from the ramparts, a large public park has been laid out on the north side of the town. Bremen is well supplied with schools and other educational institutions, and possesses a museum, a library (120,000 volumes), an observatory, etc. The manufacturing establishments include tobacco and cigar factories, sugar-refineries, rice-mills, iron-foundries, and machine works, rope and sail works, and ship-building yards. It is from its commerce, however, that Bremen derives its importance. Its situation renders it the emporium of Hanover, Brunswick, Hesse, and other countries traversed by the Weser, and next to Hamburg it is the principal seat of the export and import trade of Germany. The Weser has been deepened so that sea-going ships drawing 17 feet of water can now ascend to the Bremen docks, but the great bulk of the shipping trade centres in Bremerhaven and Geestemünde. Bremerhaven is now a place of over 18,000 inhabitants, and is provided with excellent docks capable of receiving the largest vessels; it is connected by railway with Bremen, where the chief trading companies, merchants, and brokers have their offices. The greater portion of the German trade with the United States passes through Bremen, and it is the chief port of emigration on the Continent. The chief imports are tobacco, raw cotton, and cotton manufactures, wool and woolen manufactures, rice, coffee, grain, petroleum, etc., which are of course chiefly re-exported to other parts of Germany and the Continent. Next to Liverpool, Bremen is to-day the leading European cotton market. Before the organization of the cotton exchange in 1872, the German merchants had been getting their product chiefly from Havre and Liverpool, very little being imported direct. To become independent of British ports, it was necessary to get the patronage of the inland spinners. This proved no easy task. Not until a decade had passed did the Bremen exchange cease to be a local institution and acquire a standing of national importance; but ever since the development has been phenomenal. While the importation of cotton in the year 1870 amounted to only 157,689 bales, it ran up to 397,998 bales in the year 1880. Ten years later there were 812,538 bales and the year 1900 showed the enormous figure of 1,567,045 bales. The new cotton exchange opened in 1902 is said to be not only the most imposing structure of this nature in the world, but also the most complete in the appointments necessary for carrying on the business of buying and selling cotton and supplying the leading merchants and brokers with office and sample rooms.

Bremen first rose into note about 788, when it was made the seat of a bishopric by Charlemagne. It was afterward raised to the dignity of an archbishopric, and by the end of the 14th century it had become virtually a free imperial city. At the Treaty of Westphalia in 1648 the archbishopric was secularized, and became a duchy under the supremacy of Sweden. In 1731, when the elector of Brunswick gained possession of the duchy, the privileges of Bremen as a free city were confirmed. From 1810 to 1813 it formed part of the French empire. The constitution is in most respects republican. The legislative authority is shared by the senate, a body of 18 (12 of whom must be lawyers, and 5 merchants) elected for life, and presided over by two of their own number alternately, who have the title of burgomaster; and by an assembly of 150 citizens elected for six years. The executive power is intrusted to the senate and senatorial committees. Pop. of the total territory (including Bremerhaven) (1902) 224,700.

Bremer, brä'mer, Fredrika, Swedish novelist: b. Tuorla, Finland, 17 Aug. 1801; d. Arsta, 31 Dec. 1865. At 17 she was taken on a tour through Germany, Switzerland, and France. In 1828 appeared the first volume of her '*Sketches of Everyday Life*,' but the second volume, '*The H. Family*' (1833; English translation, 1844), first revealed her power. From this time she devoted herself to writing stories that quickly became popular in translations far beyond the bounds of Sweden, and she varied her literary labor by long journeys in Italy, England, the United States, Greece, Palestine, which supplied the materials for her '*Homes of the New World*' (1853), and '*Life in the Old World*' (1862), full of fine descriptions of scenery and vivid pictures of social life, with sound views on political and moral questions. The admirable translations of Mary Howitt had preceded her in the United States as well as England, and insured her an equally warm welcome on both sides of the Atlantic. On her return to Sweden she gave herself up to philanthropy, but more particularly to the education and emancipation of women, and the consequent propagandist character of her later novels, '*Bertha*,' and '*Father and Daughter*' (1859), was detrimental in no small degree to their literary value. Her religious views she set forth in her '*Morning Watches*' (1842). She has been called the Jane Austen of Sweden. Of her stories perhaps the most perfect is '*The Neighbors*' (1837). '*The Diary*,' '*The President's Daughters*,' '*Brothers and Sisters*,' and '*Strife and Peace, or Scenes in Dalecarlia*,' are only less popular.

Bremerhaven, brä'mër-hä-fën, the port of Bremen, Germany, on the east shore of the Weser estuary, nearly 10 miles from the open sea, and 39 north-northwest of Bremen. It was founded by Bremen, in 1827, on ground acquired from Hanover, and rapidly became a thriving place. A second dock was opened in 1866, a third in 1874, and in 1888 a great port, with docks, was undertaken at Nordenham, on the opposite bank. Bremerhaven was the scene, in 1875, of a dynamite explosion on board a mail steamship, by which 60 persons were killed. The Geeste separated Bremerhaven from Geestemünde. Pop. (1900) 20,300.

Brend'amour, brän-da-moor, Franz Robert, German engraver: b. Aix-la-Chapelle, 16 Oct.

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1831. He was educated in his art at Cologne under Stephan. In 1856 he went to Düsseldorf and established a xylographic studio, which rapidly became well known and one of the leading institutions of its kind. He later set up similar studios in Berlin, Leipsic, Brunswick, Stuttgart, and Munich, to conducting which he devoted most of his time. Among his best works are a collection, 112 engravings, after drawings by Rudolf Elster; illustrations for several works, including Immermann's 'Der Oberhof,' and Count Waldersee's 'Der Jäger'; 'The Odyssey,' after drawings by Preller, and eight frescoes in the Rathhaus at Aix-la-Chapelle.

Bren'dan, or Brenainn, Saint, of Clonfert: b. 484 at what is now Tralee in Kerry; d. 577. He was educated under his relative, Bishop Erc, and St. Jarlath of Tuam, and was ordained by the former. Shortly afterward he went on a seven years' voyage in search of "the mysterious land far from human ken"; but without success. Later he visited and lived in Brittany for a time, and after his return he again set out to seek the distant paradise, which he ultimately found. When he again reached Ireland he founded the monastery of Cluain Fearta (Clonfert), and he seems to have visited Scotland at this time. His two voyages form the basis of the celebrated mediæval legend of the 'Navigation of St. Brendan'; but in the legend they are united into one and combined with other stories. Where Brendan's voyages really led him we do not know. The Book of Lismore contains a life of St. Brendan.

Another Irish saint of the same name was born about 490 and died in 573. He was a friend of Columba, and founded a monastery at Birr (Parsonstown) in King's County.

Brendel, Heinrich Albert, hīn'rih āl'bērt brēn'dēl, German painter: b. Berlin, 7 June 1827; d. 1895. He studied at the Berlin Art Academy under Krause, and in Paris as a pupil of Couture and Palizzi. After traveling in Italy and Sicily, he lived in Paris, 1854-64; he then returned to Germany and lived in Berlin and Weimar, becoming director of the Art School at the latter place. He devoted himself almost entirely to animal painting, and his pictures of sheep are considered especially fine. His works include: 'Peasant's Farm,' 'Interior of Sheep Stable,' 'Sheep Leaving Stable.'

Bren'eman, Abram Adam, American chemist: b. Lancaster, Pa., 28 April 1847. He graduated at Pennsylvania State College in 1866, and after service as an instructor, was full professor of chemistry 1869-72. From 1875 to 1882 he was assistant, lecturer, and professor of industrial chemistry at Cornell. Since then he has resided in New York, engaged in professional work as a writer, analyst, and chemical expert. He is the inventor of the Breneman process of rendering iron non-corrosive, and has made a special study of water and its contaminations. He has written: 'Manual of Introductory Laboratory Practice' (1875); 'Report on the Fixation of Atmospheric Nitrogen' (1890); and numerous contributions to chemical and other journals.

Brenham, brēn'ām, Texas, a city and county-seat of Washington County, on the Gulf, C. & S. F. and the Houston & T. C. R.R.'s, west of Houston. It is the centre of an agricultural

and cotton region, and has two cotton compresses, a cotton factory, and a cottonseed-oil mill, as well as other manufacturing interests. It is the seat of the Blim Memorial and Evangelical Lutheran colleges, has a library, two parks, and fair grounds. Pop. (1900) 5,968.

Bren'nan, Thomas Francis, Irish Catholic prelate: b. Tipperary, 1853. He was educated at Allegheny College, Pa., at Rouen, and Innsbruck. He was engaged in missionary work in Pennsylvania and was later made bishop of Dallas, Texas. In 1893 he went to Labrador, and in 1894-5 was auxiliary bishop of Newfoundland; since then he has been acting auxiliary bishop of Albano and Frascati, Italy.

Bren'ner, Mount, a mountain in the Tyrol, situated between Innsbruck and Sterzing, and between the rivers Inn, Aicha, and Adige, forming part of the Tyrolean Alps, 6,777 feet high. The road from Germany to Italy traverses this mountain. It reaches the elevation of 4,658 feet, and is about 12 miles long. This is one of the lowest roads practicable for carriages over the main chain of the Alps, and also one of the most ancient, having been used by the Romans. In 1867 a railway over the Brenner Pass was opened, so that Italy and Germany were connected by an unbroken line of rails.

Bren'nus, the name or title of several princes of the ancient Gauls, supposed to be derived from the Kymrian *breinlin*, a king. A leader of the Senones, a Gallic nation in the upper part of Italy, the most famous personage who is mentioned under this name, made an invasion into the Roman territory about the year 390 B.C. A battle was fought near the river Allia, the Romans were totally defeated, and Brennus took possession of the city, which had been previously abandoned by the inhabitants. The capitol only was provided with a garrison, but several aged citizens of rank, amounting in the whole to about 80, had resolved to remain in the city and devote themselves to the infernal deities. Attired in their sacerdotal, consular, and triumphal robes, they seated themselves in their chairs of office in the middle of the forum, awaiting death. When Brennus arrived at the forum, he was struck with astonishment at their venerable aspect. The Gauls looked upon them as so many statues of deities, and feared to go near them, but ultimately they were all massacred. Rome was sacked, and all the inhabitants who yet remained in their houses were slain. Brennus then assaulted the capitol, and being repelled with considerable loss, he set fire to the city and leveled it with the ground. While the garrison of the capitol was in great distress Brennus attempted a surprise by night, in which he would have succeeded had not the cackling of the geese, sacred to Juno, alarmed the garrison, in consequence of which the Gauls were repulsed. After six months Brennus offered to raise the siege and leave the Roman territory for 1,000 pounds of gold. When the gold was weighed, Brennus threw his sword into the scale beside the weights and cried out, "Woe to the vanquished!" According to Polybius the Gauls returned home in safety with their booty. According to the Roman legend followed by Livy, Brennus was defeated, and his army entirely destroyed by Camillus, a distinguished

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Roman exile who had retired to the city of Ardea, and who arrived with succor in time to save the capitol.

Another Brennus in 279 B.C. advanced into Greece with an enormous force, said to have amounted to 150,000 foot and 61,000 horse. After ravaging Macedonia he entered Thessaly and marched toward Thermopylae, where an army of 20,000 Greeks was assembled, supported by an Athenian fleet on the coast. The Gauls were repulsed in a sanguinary battle, but, in order to separate the Greeks, they dispersed themselves to plunder the country. Brennus himself attacked the temple of Delphi, which was defended by only 4,000 men, but was again repulsed, and carried out of the battle fainting with his wounds. Unwilling to survive his defeat, he put an end to his life by copious draughts of wine. The Greeks attributed their victory to the assistance of Apollo.

Brent, Charles Henry, American clergyman: b. Newcastle, Ontario, Canada, 1862. He was graduated at the University of Trinity College in 1884, ordained deacon in the Protestant Episcopal Church in 1886, priest in 1887, and consecrated the first bishop of the Protestant Episcopal Church for the Philippine Islands in December 1901. He served in the ministry of St. Paul's Pro-Cathedral, Buffalo, 1887-8; removed to Boston in the latter year, where he had charge of the parish of St. John the Evangelist, and later of that of St. Stephen's Church, devoting himself entirely to the missionary work of the latter parish. He has performed considerable literary work; was on the editorial staff of the *New York Churchman* for some time, and is the author of 'With God in the World,' and other books.

Brent Goose. See BRANT GOOSE.

Bren'ta (ancient MEDOACUS MAJOR), a river in north Italy. Its source is Lake Caldonazzo in the Tyrol, eight miles southeast of Trent, whence it flows southeast, with a winding course of 112 miles, and falls into the Adriatic through the canal of Brenta-nova or Brentono, at Brondolo. Formerly its embouchure was at Fusina, opposite Venice. The old course has been formed into a canal, and is the chief means of communication between Padua and Venice, the new channel being comparatively little used.

Brentano, brën-tä'nō, Clemens, German poet: b. Frankfort-on-the-Main, 8 Sept. 1778; d. Aschaffenburg, 28 July 1842. He studied at Jena, and resided by turns there and at Frankfort, Heidelberg, Vienna, and Berlin. In 1818 he retired to the convent of Dülmen, in Münster, and the latter years of his life were spent at Ratisbon, Munich, and Frankfort-on-the-Main. These frequent changes were due to a restless disposition, combined with morbid and misanthropic views, which gave a peculiar character to his writings. With a powerful imagination, his genius was tinged with mysticism, eccentricity, and a strong tendency to sarcasm. He was the brother of Elizabeth von Arnim, Goethe's "Bettina." Among his principal works are 'Satires and Poetical Fancies' (1800); 'The Mother's Statue' (1801), an ultra-romantic production, which he himself calls a very wild romance; 'The Joyous Musicians' (1803); 'Ponce de Leon' (1804); 'The Founding of Prague' (1816), said to be his most successful drama; 'Gokel, Hinkel, und Gakeleia' (1838),

a satire on the times; 'History of the Brave Caspar and the Beautiful Annerl' (2d ed. 1851), which is considered a masterpiece as a novelette.

Brentano, Franz, German philosopher: b. Marienberg, 16 Jan. 1838. He was professor of philosophy at Würzburg, but in 1873 resigned his position on account of the doctrine of the infallibility of the Pope; and was professor at Vienna, 1874-80. He has written 'Psychology of Aristotle,' 'New Riddles,' and 'Psychology from an Empirical Standpoint' (in agreement with Lotze and the English empirical psychologists).

Brentano, Lorenzo, German American politician: b. Mannheim, 4 Nov. 1813; d. Chicago, 18 Sept. 1891. He studied law at Heidelberg, represented Mannheim in the Lower House of Baden, and was a member of the National Assembly in 1848. He withdrew from this body with the majority of the radical party in 1849. He was placed at the head of the revolutionary government of Baden, but suspected of treachery to his party, was forced to flee to Switzerland. In 1850 he came to the United States, lived for a time on a farm in Michigan, and then went to Chicago. Here he practised law and established the Illinois *Staatszeitung*, which he made one of the most influential papers in the northwest in the interest of the Federal government. He was a member of the Illinois legislature in 1862; United States consul at Dresden 1872-6, and member of Congress from Illinois in 1876.

Brentano, Lujo, loo'yō, German political economist: b. Aschaffenburg, Bavaria, 18 Dec. 1844. He studied at Dublin and at four German universities; and, after attaining a post in the Royal Statistical Seminary in Berlin, went to England to study the condition of the working classes, and especially trades' associations and unions. The outcome of this was his work, 'On the History and Development of English Guilds' (1870); 'Die Arbeitergilden der Gegenwart' (1871-2). He has been professor at Breslau (1873), Strasburg, Vienna, Leipsic, Munich (1891). He supports the "Socialists of the Chair" (*Kathedersozialisten*) against the German free-trade school, and has written works on 'Wages' (1877); 'Labor in Relation to Land' (1877), and 'Compulsory Insurance for Workmen' (1881), on the English Chartists, on the Christian Socialist movement in England, and numerous polemical pamphlets.

Brent'ford, the county town of Middlesex, England, seven miles west of London. It has a weekly market and two annual fairs. Here Edmund Ironside defeated the Danes, under Canute, in 1016; and Prince Rupert a part of the parliamentary forces, under Col. Hollis, in 1642. Sion House, the magnificent edifice of the Duke of Somerset, where Lady Jane Grey resided, now belonging to the Duke of Northumberland, was built here on the site of a suppressed nunnery. Brentford has a considerable retail trade, a soap manufactory, and extensive sawing and planing mills. Pop. (1891) 13,738; (1901) 15,171.

Brenton, William, colonial governor: b. England, early in the 17th century; d. Newport, R. I., 1674. His family came to Rhode Island from Hammersmith, England, where they were of good social standing. Between 1635 and 1669 Brenton was the colony's representative at

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Boston, lieutenant-governor, president of the colony, and governor under the Charles II. charter 1666-9. He was one of the nine original proprietaries of Rhode Island; he selected and surveyed the site of Newport, and built a large brick residence where Fort Adams now stands. Brenton's Point and Brenton's Reef in Narragansett Bay preserve his name. See 'Rhode Island Colonial Records,' Vols. I. and II., *passim*.

Brenz, Johann, yō'hān brēnts, German reformer: b. 1499; d. 1570. He was one of the authors of the *Syngramma Suevicum*, bearing upon the controversy with Zwingli and Ecolampadius, on the subject of the Lord's Supper. He was the most resolute among the opponents of the interdict of Charles V., escaping death only by resorting to flight.

Brereton, Austin, English journalist: b. Liverpool, England, 13 July 1862. He went to London in 1881, has been dramatic critic of 'The Sphere' from 1901, and prior to that date was connected with 'The Stage'; 'The Theatre'; Sydney (N. S. W.) *Morning Herald*; and the 'Illustrated American,' New York. He has published Henry Irving's 'A Biographical Sketch' (1883); 'Some Famous Hamlets' (1884); 'Dramatic Notes' (1886); 'Shakespearean Scenes and Characters' (1886); 'Romeo and Juliet on the Stage' (1890); 'Sarah Bernhardt' (1891); 'Gallery of Players' (1894); 'Short History of the Strand Theatre' (1899); 'Cheltenham' (1899); 'By the Silent Highway' (1901); 'Peg Woffington, On and Off the Stage' (1901); 'The Well of St. Anne' (1901); 'A Ramble in Bath' (1901).

Brescia, brē'shā (Latin, *Brixia*), an episcopal city of Lombardy, Italy. It is situated at the foot of the Alps, 40 miles northwest of Verona, on a fertile and beautiful plain on the banks of the rivers Mella and Garza. It is the capital of the province of the same name, and is a handsome and flourishing city, of a square form, about four miles in circuit, and surrounded by walls. Its streets are spacious, and its public buildings numerous, particularly its churches, which are further remarkable for the number and value of the paintings with which they are enriched. A few of them only, however, have much pretension to architectural beauty; among those that have are the cathedral, a handsome structure of white marble, and the Church of San Domenico. But, however plain in exterior appearance most of the Brescian churches may be, they are all richly decorated within with the most beautiful frescoes, and other creations of taste and art. The other buildings most worthy of notice are the Palazzo della Loggia, and the Broletto. The first was intended for the palace of the municipality, or city hall. It is composed of the richest marbles, and was worked upon by the first architects of the 15th and 16th centuries successively. The Broletto, the ancient palace of the republic, combines the characters of fortress and city hall, and is surmounted by a great tower, whose deeply cleft Italian battlements produce a singularly grand effect. The whole is in a colossal style, and marked by the peculiar characteristics of the age in which it rose — supposed to be about the end of the 12th, and beginning of the 13th century. The city contains also a lyceum, two gymnasia, an *athenæum*, a college, with a museum of antiquities,

and a botanic garden; a public library, with 30,000 volumes; a theological seminary, a handsome theatre, a corn exchange, an extensive hospital, and other educational and charitable establishments. There are 72 public fountains in the streets and squares, besides some hundreds of private ones. Outside the town is a cemetery, begun in 1815, designed by Vantini.

Brescia is a place of considerable trade and manufacturing industry. Near it are large iron-works, and its firearms are esteemed the best that are made in Italy. It has also silk, linen, and paper factories, tan-yards, and oil-mills, and is an important mart for raw silk. But it derives its greatest interest from its fine Roman remains, having been at one time the seat of a Roman colony. These first attracted attention in the 17th century; although, so far as regards inscriptions, they had been objects of especial care to the citizens of Brescia for two centuries before this period, but it was not till 1820 that any very earnest efforts were made to bring the buried remains of entire buildings to light. Since that period some remarkable discoveries have been made, embracing besides numerous statues and inscriptions the beautiful marble temple of Vespasian, and a number of noble and magnificent Corinthian columns, with many fragments of moldings and ornaments, some gilt, and all of great elegance. Brescia was the seat of a school of painting of great merit, to which many eminent artists belonged, including Alessandro Bonvicino, commonly called 'Il Moretto,' who flourished in the 16th century, and was remarkable for the deep devotional feeling which he threw into his sacred subjects, as well as for his excellence as a portrait painter. The city is of great antiquity, having been the chief town of the Cenomani, a Gallic tribe, who were conquered by the Romans. It became the seat of a Roman colony under Augustus about 15 B.C., and afterward a municipium. In the year 412 it was burned by the Goths; and was soon afterward destroyed by Attila; but was rebuilt about the year 452. It was taken by Charlemagne in 774. In 936 Otho I. of Saxony declared it a free city, and it so remained for nearly three centuries, taking an active part in the feuds of the Guelphs and Ghibellines, and ultimately put itself under the protection of Venice in 1426. In 1796 it was taken by the French, and was assigned to Austria by the general treaty signed at Vienna 9 June 1815. In 1849 it was involved in the commotions of continental Europe; its streets were barricaded, but the city was eventually captured by the Austrians under Gen. Haynau. It was ceded to Sardinia by the Treaty of Zürich in 1859. Pop. (1896) 67,500; (1901) 70,618.

Breslau, brēs'low, a city of Germany, the second in size in the Prussian dominions, being exceeded in population only by the capital, Berlin; the capital of the province of Silesia. It is situated in a spacious plain at the confluence of the Ohlau and the Oder, the latter dividing into two main portions (the largest on the left bank), which, with islands in the river, are connected by a large number of bridges. The streets of the older quarters are narrow, those of the newer broad. There are electric and other tramways. The public squares and buildings are handsome. The fortifications which surrounded the old or inner city have been con-

verted into promenades, and the ditch into an ornamental sheet of water. The cathedral, built in 1148-1680, and restored in 1875, the Protestant churches of St. Elizabeth and St. Mary Magdalene, the Rathhaus or city hall, a Gothic structure of the 14th and 15th centuries, the municipal buildings, the government buildings, the building for the provincial diet, the royal residence, court-houses, exchange, and university buildings are among the most remarkable buildings. The university was founded in 1702 as a Roman Catholic institution, with which was combined the Protestant university at Frankfort-on-the-Oder, transferred hither in 1811. The university has attached to it a museum of natural history, a cabinet of antiquities, a library of 320,000 volumes, including many old works and manuscripts, an observatory, a picture gallery, a botanic garden, etc. The number of students is about 1,500. There are numerous other educational institutions, as well as hospitals and asylums. Breslau carries on an extensive trade in the products and manufactures of Silesia, principally in corn, wool, metals, glass, coal, and timber. The Oder is navigable and there is a connection with Berlin by the Oder-Spree Canal. The industries comprise iron-founding, bell-founding, the manufacture of machinery, railway carriages, organs, and other musical instruments, cigars, oil, spirits, etc., brewing, and glass-painting. There are two annual wool-fairs, which are largely attended. Breslau was the seat of a bishopric by the year 1000; an independent duchy from 1163 to 1335; was ceded to Austria, after many wars and calamities, in 1527. It was conquered by Frederick II. of Prussia in 1741. It was from this time the scene of frequent warfare, being successively attacked by Austrians, French, Russians, and Prussians. It was twice occupied by the French, in 1807 and 1813. Its fortifications were destroyed by Napoleon in 1807, but it finally remained in the hands of Prussia. Pop. (1895) 405,041; (1900) 422,738; (1903) 433,350.

Bressani, Francesco Giuseppe, frân-chës'kô joo-sép'pê brës-sa'ne, Italian missionary: b. Rome, 1612; d. Florence, 9 Sept. 1672. He labored during nine years among the Huron Indians of Canada, was captured and ill treated by the Iroquois, and afterward sold to the Dutch and kept in bondage until 1644, when he was ransomed. On his return to Italy, he published a book on the Jesuit missionaries in Canada.

Bressay, brës'sā, one of the Shetland Islands, lying east of the mainland, and separated from it by Bressay Sound, about six miles long and one to three in breadth. Its line of coast is rocky and deeply indented; the interior is hilly, rising in the Wart of Bressay to 742 feet, and is to a great extent covered with peat-moss. There are a number of small streams and small lakes. On the south there are three bold headlands, the Ord, the Bard, and the Hammar. The inhabitants are mostly crofters, sailors in the merchant service, or fishermen. Hosiery is the only manufacture. Bressay Sound forms a safe harbor (Lerwick Harbor), one mile or more in breadth, having Lerwick on its west side. Pop. (1891) 802; (1901) 1,686.

Brest, a fortified seaport and naval station of France, in the department of Finistère, in the former province of Brittany, situated at the

mouth of the Penfeld, 320 miles south by west from Paris. It has one of the best harbors in France, and a safe roadstead, capable of containing 500 men-of-war in 8, 10, and 15 fathoms at low water, and it is the chief station of the French marine. The coast on both sides is well fortified. The entrance to the roads, known as Le Goulet, is narrow and difficult, with covered rocks that make it dangerous to those not well acquainted with it. There are immense magazines, workshops, barracks, roperies, etc., and the dockyard employs from 8,000 to 9,000 men. Several docks are cut in the solid rock. Brest, which in the Middle Ages was of so much importance that it was said, "He is not Duke of Brittany who is not lord of Brest," had sunk by the beginning of the reign of Louis XIII. to little more than a village. Richelieu resolved to make it the seat of a vast naval arsenal, but little was done till the beginning of the reign of Louis XIV., when Duquesne came to superintend the works. Vauban followed him, and fortified it. In 1694 the combined fleets of England and Holland disembarked a force which attempted to take Brest, but was repulsed with great loss. On 1 June 1794 the French fleet was beaten off Brest by the British, under Howe, who took from them six ships of the line, and sunk a seventh. The manufacturing industry of Brest is inconsiderable, but its commerce is extensive. Its chief exports are cereals; its principal imports colonial produce and naval stores. Pop. (1896) 74,538.

Brest-Litovski, brës't-le-tôfs'kê, a fortified town of Russia, in the government of Grodno, on the Bug, 120 miles east of Warsaw, an important railroad centre with a large trade in cloth, leather, and soap. It is a fortress of the first rank, with vast magazines and military stores. Pop. (1897) 46,542.

Bretagne. See BRITANNY.

Breteuil, Louis Charles Auguste le Tonnellier, loo-ê ô-goost le tôn-nêl-yâ brê-tê-y' (BARON DE), French diplomatist: b. 1730; d. 2 Nov. 1807. After a period of military service he became in 1758 minister plenipotentiary at Copenhagen, and afterward occupied similar posts in Sweden, Austria, Naples, and again in Vienna. His embassy to Vienna explains his attachment to the Queen Marie Antoinette. As minister and secretary of state after Necker's dismissal in 1789, he was a zealous defender of the monarchy; he was therefore considered as one of the greatest enemies of the Revolution. After the capture of the Bastille, he escaped by a hasty flight. In 1790 Louis XVI. entrusted him with secret negotiations for his restoration to the throne, at the principal northern courts. The convention issued a decree against him. In 1802 he returned, with the permission of the government, to France.

Brethren and Clerks of the Common Life, a religious society which sprang up in the Netherlands near the close of the 14th century, founded by Gerhard Groot de Deventer. It was divided into two classes, the lettered and the illiterate. The first class was mainly composed of the clergy, who gave themselves to study and copying books, while the second class engaged in manual labor. They lived in common, so far as possessions were concerned, though they inhabited separate houses. They were sanctioned by the Council of Constance in

BRETHREN OF THE CHRISTIAN SCHOOLS — BRETON DE LOS HERREROS

the 15th century. There were houses also for sisters of the society. This community is frequently confounded with the Beguins and Lollards. Its members lived under the rule of Augustine. To them we owe the preservation of many valuable manuscripts. Thomas à Kempis, author of the 'Imitation of Christ,' was a member of the Brethren of the Common Life.

Brethren of the Christian Schools, an order established at Rheims by the Saint Jean Baptiste de La Salle in 1679, and sanctioned by Benedict XIII. in 1725, six years after the death of the founder. The object of the order was to provide instruction for the poorer classes of the population, and hence the name. The members of the order take upon themselves the vows of chastity, poverty, and obedience. These vows are first taken annually for a series of years, and then renewed finally for life by those who desire to remain in the order. Their costume is a coarse black cassock, and a small collar or band around the neck, for the house, and a hooded cloak and a wide hat for out-door purposes. Their teaching is mainly rudimentary, although in some of their schools Latin and the higher mathematics form part of the course. No member may become a priest, and lest they should aspire to that dignity, the brethren are forbidden to study Latin until reaching the age of 30. In 1688 the order was introduced into Paris. In 1792, they refused to take the oath to the civil constitution, and were driven from their houses and debarred the exercise of their functions. At the peace of 1801 they returned to their schools, and soon spread themselves again over France, whence they extended into Italy, Corsica, Cayenne, Belgium, and Algiers. They are exempt from military duty in France. In 1830, in the revolution of July, the persecution which fell upon the Jesuits also visited them. The aid of government was withdrawn. At that epoch, they opened evening schools for adults, wherein they received and taught mechanics and other poor laborers, who had no time to devote to learning in the day. They have modified their instruction from time to time to make it meet the wants of the classes whom they teach. Thus, in 1831, geometry in its application to linear drawing was introduced into their course. The Brethren of the Christian Schools are sometimes improperly called the "Christian Brothers." The latter have nearly the same rule and object, but form an independent order. They are very numerous in Ireland.

Brethren of the Free Spirit, a sect which sprang up on the upper Rhine near the beginning of the 13th century. They are frequently confounded with the Lollards, Beguards, or Beguins. They held that the universe was a divine emanation; that man, so far as he gave himself to a contemplative life, was a Christ, and as such, free from law, human or divine (Romans viii. 2, 14). Many edicts were published against this sect, but it continued to exist under various names, such as Picards and Adamites, till about the first quarter of the 15th century.

Brethren of the Holy Trinity, a religious society, founded in France near the close of the 12th century, whose members pledged themselves to give a third part of their revenues to procuring the redemption of Christians who had fallen

captive to the infidels, and were in Mohammedan slavery. It was established by John of Matha, a Parisian theologian, and Felix de Valois.

Brethren of the Strict Observance, the stricter Franciscans, or Regular Observatines.

Bretigny, brê-tên-yê, a village of France in the department of Eure-et-Loire, six miles southeast of Châtres, on the Paris & O. R.R. By the treaty of Bretigny, concluded on 8 May 1360, between Edward III. of England and John II. of France, the latter, who had been taken prisoner at the battle of Poitiers, recovered his liberty on a ransom of 3,000,000 crowns, to be paid in six years. Edward renounced his claim to the crown of France, and relinquished a portion of his conquests and possessions in that country, including Anjou and Maine, and the greater part of Normandy; receiving the cession in independent sovereignty of the duchy of Aquitaine, with all its dependencies; Gascony, Poitou, Saintonge, Aunis, Agenois, Périgord, Limousin, Quercy, Rouergue, Angoumois, together with Calais, the counties of Ponthieu and Guines, and the viscounty of Montreuil.

Breton, Jean Baptiste Joseph, zhôn báp-têst zhō-zêf brê-tôn, French journalist: b. Paris, 16 Nov. 1777; d. 6 Jan. 1852. His public career as journalist and stenographer was nearly parallel with representative government in France. He was present as stenographer at the session of 10 Aug. 1792, when the power passed from the hands of an individual to those of an assembly; and of 2 Dec. 1851, when it passed from the hands of an assembly to those of an individual. His services were also in constant requisition at the courts as an interpreter for English, German, Italian, Spanish, Dutch, and Flemish suitors. He was a frequent contributor to the 'Dictionnaire de la Conversation,' and among other papers wrote the article on stenography.

Breton, Jules Adolphe, zhül ä-dölf, French painter: b. Courrières, 1 May 1827. He was educated at St. Omer and at Douai, and trained as a painter under Félix Devigne at Ghent, and at Drolling's *atelier* in Paris. The subjects of his earlier pictures, such as 'Misère de Désespoir' (1849), are taken from the French revolutionary period; but he soon turned to the scenes from peasant life which he has treated in a most poetic and suggestive manner, with an admirable union of style with realism. In 1853 he exhibited 'Le Retour des Moissonneurs' and in 1855 his celebrated 'Les Glaneuses.' He is represented in the Luxembourg by 'La Bénédiction des Blés' (1857), admirable for its rendering of sunlight; 'Le Rappel des Glaneuses' (1859); and 'Le Soir' (1861). His later works are simpler in their component parts and larger in the scale of their figures, and of these 'La Fontaine' is a typical example. Breton is also known as a poet.

Breton de los Herreros, brâ-tôn' dâ lōs ä-râ-rōs, **Don Manuel**, Spanish dramatist: b. Quel, province of Logroño, 19 Dec. 1800; d. Madrid, 13 Nov. 1873. He was the most notable Spanish poet of the first half of the 19th century. He gave to the Spanish stage 150 plays, some of them original, others derived from ancient Spanish sources, or translated from French or Italian. In him the old French comedy finds not so much an imitator as its last true representative. Among his best original

BRETON LITERATURE — BREUGHEL

comedies are: 'I'm Going Back to Madrid,' 'Here I am in Madrid,' 'This World is All a Farce,' 'Die Once and You'll See.' He was less successful in the historic drama than in comedy.

Bret'on Literature. See CELTIC LANGUAGE AND LITERATURE.

Brets, Brettys, or Brits, Britons, the name given to the Welsh or ancient Britons in general; also to those of Strathclyde, as distinguished from the Scots and Picts.

Bretschneider, brët'shni-dër, **Heinrich Gottfried von,** German writer: b. Gera, 6 May 1739; d. 1 Nov. 1810. He was educated at the institute of Herrnhuters at Ebersdorf, entered the army as a cornet in the regiment of Count Bruhl, was present at the battle of Koln, and afterward became captain of a Prussian free-corps, and was made prisoner by the French. During his forced stay in France he acquainted himself with the language, and with the spirit of the people. On his return he was appointed governor of Usingen in Nassau. This government being shortly suppressed, he traveled in England and France, and became associated with Count Vergennes, who employed him in diplomatic missions. He returned to Germany in 1772, and was shortly afterward engaged in the service of Austria, where he was first named vice-governor of the banat of Temesvar. This banat having been incorporated in Hungary in 1778, he obtained the appointment of librarian to the University of Buda. Here his hostility to the monks, and especially to the Jesuits, led him into trouble; although the Emperor Joseph II., who held the same views, declared himself his protector. He was obliged to retire from Buda, and was appointed librarian at Lemberg, and also counselor to the government. In 1809 he retired with the title of aulic counselor. His views were liberal and somewhat sceptical, and with his active opposition to the monastic orders, gained him many enemies. His principal works are: 'Reise nach London und Paris' (1817); 'Almanach der Heiligen' (for the year 1788); 'Wallers Leben und Sitten' (1793).

Bretschneider, Karl Gottlieb, German theologian: b. Gersdorf, Saxony, 11 Feb. 1776; d. Gotha, 22 Jan. 1848. He studied theology at Leipsic, was appointed pastor at Schneeberg in 1807, general superintendent at Gotha in 1816, and afterward counselor of the Upper Consistory there. Bretschneider established a reputation as a sound and judicious thinker of rationalistic bias, and his theological writings are admitted to have a permanent value. In 1820 appeared his 'Probabilia de Evangelii et Epistolarum Johannis Apostoli Indole et Origine,' an attack upon the Johannine authorship from internal evidence, and in 1824 his 'Lexicon Manuale Græco-Latinum in Libros Novi Testamenti.' Another work of importance is his 'Handbuch der Dogmatik' (4th ed. 1838). Bretschneider also wrote on many other theological questions and controversies.

Bret'ten, a town of Baden, Germany, the birthplace of Melancthon, 16 miles east-northeast of Carlsruhe by rail. The house in which Melancthon was born belongs now to a foundation bearing his name for the support of poor students, established in 1861. A monument was erected in 1867. Pop. (1900) 4,800.

Bretts and Scots, Laws of, the name given in the 13th century to a code of laws in use among the Celtic tribes in Scotland, the Scots being the Celts north of the Forth and Clyde, and the Bretts being the remains of the British inhabitants of the kingdom of Cambria, Cum-bria, or Strathclyde, and Reged. Edward I. issued in 1305 an ordinance abolishing the usages of the Scots and Bretts. Only a fragment of them has been preserved.

Bretwalda, brët'val-da, a title applied to one of the Anglo-Saxon tribal chiefs or kings, who, it is supposed, was from time to time chosen by the other chiefs, nobility, and caldormen to be a sort of dictator in their wars with the Britons. The following are mentioned by Bede, but Hallam and other historians doubt whether any sovereign in those early times possessed such authority: 492 A.D., Ella, king of Sussex; 571, Ceawlin, king of Wessex; 594, Ethelbert, king of Kent; 615, Redwald, king of the West Angles; 623, Edwin, king of Deira; 634, Oswald, king of Bernicia; 643, Oswy, king of Bernicia.

Breughel, brë-nël, the name of a celebrated Dutch family of painters, the first of whom adopted this name from a village not far from Breda. This was Pieter Breughel, also called, from the character and subject of most of his representations, the "Droll" or the "Peasants' Breughel." He was born in 1510 (according to Mechel, in 1530), was a pupil of Peter Koeck van Aelst, traveled in Italy and France copying the beauties of nature, and after his return fixed his residence at Antwerp, where he was received into the Academy of Painters in that place. He subsequently married the daughter of his instructor, Koeck, and removed to Brussels, where he died in 1570 (according to some in 1590). In his rural weddings, his rustic feasts and dances, he strikingly represents the gaiety of the villagers, as he himself had frequently observed them, in disguise, in his youth. He also etched, but many of his pictures have been engraved by others. He left two sons—Pieter and Jan. The former (called the Younger Breughel), preferring subjects affording striking contrasts, painted many scenes in which devils, witches, or robbers are the principal figures. This particular turn of genius procured him the name of "Hell Breughel." Among his pieces are: 'Orpheus Playing on his Lyre Before the Infernal Deities,' and also 'The Temptation of St. Anthony.' The former picture hangs in the gallery of Florence. The second brother, Jan, was distinguished by his landscapes and small figures. From his usual dress he received the title of "Velvet Breughel." He also painted for other masters landscapes as backgrounds to their pieces, and sometimes little figures in them. He was a very prolific artist. In connection with Rubens he represented Adam and Eve in Paradise. The figures in this picture are painted by Rubens. This piece, his 'Four Elements,' also 'Vertumnus and Pomona,' which were all executed jointly with Rubens, are among his principal performances. He is said to have been born in 1568; other authorities say 1569, 1575, or 1589. He visited Italy, and enriched his imagination with beautiful scenery. He is said to have died in 1642, or by other authorities 1625. Other members of this family, belonging to a later period,

are Ambrose, who was director of the Antwerp Academy of Painting between 1635 and 1670; and Abraham, who for a time resided in Italy, and died in 1690; the brother of the latter, John Baptist, who died in Rome; and Abraham's son, Caspar Breughel, known as a painter of flowers and fruits.

Breve, brêv, a note of the third degree of length, and formerly of a square figure, as \boxplus ; but now made of an oval shape, with a line perpendicular to the stave on each of its sides: \boxminus . The breve, in its simple state, that is, without a dot after it, is equal in duration to one quarter of a large, or to two semibreves, and is then called imperfect; but, when dotted, it is equal to three eighths of a large, or to three semibreves, which being the greatest length it can assume, it is then called perfect. It is now chiefly used at the close of passages or compositions.

Brevet', a term borrowed from the French, and applied in the United States and Great Britain to rank in the army conferred upon officers on account of special and long service, and higher than that for which regimental pay is received. Thus a brevet-major serves as captain in his regiment, and draws pay as such.

Breviarium of Eutropius, the only existing work by Eutropius. It is a treatise in 10 brief books or chapters, recounting the history of Rome from the foundation of the city to the time of Valens, 364 A.D. Its style is notably good and the work has been much drawn upon by later writers. The best critical edition of 'The Breviarium' is that by Droysen.

Breviary (from the Latin *breviarium*), a summary or abridgment of prayers. The breviary is the book containing the daily offices which all who are in orders, or enjoy any Catholic benefice, are obliged to read. It is an abridgment of similar offices previously in use. The breviary contains prayers or offices to be used at the seven canonical hours of matins and lauds, prime, tierce, sext, nones, vespers, and compline. It is not known at what time the use of the breviary was first enjoined. In the Acts of the Apostles we find the third, sixth, and ninth hours especially mentioned. From Clement of Alexandria, Tertullian, Cyprrian, and others, we learn that the observance of these hours was general among Christians. St. Basil, St. Jerome, and St. Ambrose speak of the seven hours called canonical. The services in use in the convents and monasteries in the early ages were very exhaustive from their great length. A council held at Tours in 567 enjoined that matins and vespers should never have less than 12 psalms each, and that the former should have 30 in Lent. It was under Pope Gregory VII. (1073-85) that the abridgment of the offices began to be considered necessary. In 1241 a breviary revised by Haymon obtained the approbation of Gregory IX., and was introduced in all the churches of Rome under Nicholas III. In 1568 Pius V. published a breviary which has remained, with few modifications, to the present day. The Roman breviary, however, was never fully accepted by the Gallican Church, which persisted in maintaining its own offices. The Ultramontane party there had long struggled in vain for the introduction of the Roman breviary, but from 1840 to 1864, by a final and vigorous effort, the opposition of the Gal-

lican party was overcome, and the uniformity of usage generally established, though to the dissatisfaction of a large number of French Catholics.

The Psalms occupy a large place in the breviary, the order of the reading being so arranged that in general 100 psalms shall be recited in a week. Passages from the Old and New Testament and from the fathers have the next place. All the services are in Latin, and their arrangement, which is adapted to the various seasons and festivals of the Church, is very complex. The English Book of Common Prayer is based on the Roman breviary. There is a translation of the breviary into English by the Marquis of Bute (1880).

Breviary of Alaric, a compendium of Roman law dated from the first decade of the 6th century and compiled at the command of Alaric II., king of the Visigoths. It consisted of abridgements of the code and novels of Theodosius, the institutes of Gaius, etc., and contained a detailed commentary styled the 'Interpretatio.' It was intended for the Roman subjects of the Visigothic ruler, and must not be confused with the 'Forum Judicum' or 'Judicum Liber,' which Alaric put forth for his barbarian vassals. See Lee, 'Historical Jurisprudence' (1900).

Brevipen'nes, a family or subdivision of birds, but occupying a different position in different systems. Cuvier makes it a family of the order *Grallæ* or waders. In more modern systems it corresponds to the order of Cursorial birds or *Ratitæ*. It includes at least two genera, the ostrich and the cassowary. The Dodo and Apteryx are also referred to it. The Brevipennes have a resemblance in several of their distinctive characteristics to the *Gallinacæ*. Their pectoral muscles are reduced to extreme tenuity, and the sternum has no ridge, while the muscles of the thighs are of great strength and thickness. They are thus fitted for walking or running, rather than for flying. As their name implies their wings are short.

Brevoort', James Renwick, American artist: b. Westchester County, N. Y., 20 July 1832. His art studies were made chiefly in Europe, where he spent several years sketching scenes in England, Holland, and Italy. In 1861 he was elected an associate of the National Academy, and in 1863 a full member. Since 1872 he has been its professor of perspective. His specialty as a painter is landscape work, and the following pictures of his are well known: 'Lake of Como' (1878); 'Storm on English Moor' (1882); 'New England Scene'; 'Morning in Early Winter' (1884); 'The Wild November Comes at Last'; 'Windy Day on a Moor' (1886).

Brewer, David Josiah, American jurist: b. Smyrna, Asia Minor, 20 June 1837. He graduated at Yale College 1856, at Albany Law School 1858. He studied law in the office of his uncle, David Dudley Field, and was admitted to the bar in New York in 1858. Removing to Kansas, he became prominent in his profession. He was judge of the supreme court of Kansas 1870-81, and was appointed United States judge for the 8th circuit in 1884. He rendered a memorable decision on the Kansas Prohibition Law, affirming the right of liquor manufacturers to compensation, for which he was

BREWER—BREWING AND MALTING

severely criticised by the Prohibitionists. President Harrison elevated him to the supreme court of the United States in 1889. He was made a member of the Venezuelan commission by President Cleveland in 1896, and was chosen its chairman.

Brewer, John Hyatt, American musician: b. Brooklyn, N. Y., 1856. He studied piano, organ, and theory under local teachers, particularly Dudley Buck. He has filled the position of organist at the Church of the Messiah and the Clinton Avenue Congregational Church, Brooklyn, and since 1881 at the Lafayette Avenue Presbyterian Church in that borough, where he is also professor of vocal music at Adelphi College. His compositions include church music, vocal music, and works for the piano, organ, and orchestra.

Brewer, Leigh Richmond, American Protestant Episcopal bishop: b. Berkshire, Vt., 20 Jan. 1839. He was ordained in 1867, and after serving as rector of Grace Church, Carthage, N. Y., 1866-72, and Trinity Church, Watertown, N. Y., 1872-80, was consecrated missionary bishop of Montana in the year last named.

Brewer, Thomas Mayo, American ornithologist: b. Boston, Mass., 21 Nov. 1814; d. 23 Jan. 1880. He was graduated at Harvard College in 1835, and was editor of the Boston *Atlas* in 1840. He edited Wilson's 'Ornithology' and 'Birds of North America,' and, in conjunction with Baird and Ridgeway, wrote 'A History of North American Birds.'

Brewer, William Henry, American agricultural scientist: b. Poughkeepsie, N. Y., 14 Sept. 1828. He was graduated from the Sheffield Scientific School, New Haven, in 1852, and has been professor of agriculture there from 1864. He has been a member of the National Academy of Sciences from 1880, of the Connecticut State board of health from 1892, and of the State board of agriculture for a long period. He has been one of the most prominent American leaders in agricultural research and is a valued authority on all related topics. Besides contributing to the 'Report on Cereal Production' in the United States Tenth Census (1883), he has edited the 'Botany of California' (1886).

Brewerton, Henry, American soldier: b. New York, 1801; d. Washington, D. C., 17 April 1879. He was graduated with the class of 1819 at West Point. Commissioned second lieutenant in the corps of engineers, he first served as assistant in determining the 45th degree of north latitude at Rouse's Point, N. Y. He was assistant and professor of engineering at West Point (1819-21). Thereafter he was almost continuously engaged in such important engineering works as repairing the fortifications in New York harbor, construction of Fort Jackson, La., of Fort Adams, Newport, R. I., of the defenses of Charleston harbor, S. C., of the fortifications and improvements of Baltimore harbor (1861-4), and of Forts Monroe and Wool, for the defense of Hampton Roads, Va. He was brevetted brigadier-general in the United States army, 13 March 1865, for long, faithful, and meritorious services, and was retired from active service 7 March 1867, "having been borne on the Army Register more than 45 years." Dickinson College conferred the degree of LL.D. upon him, 8 July 1847.

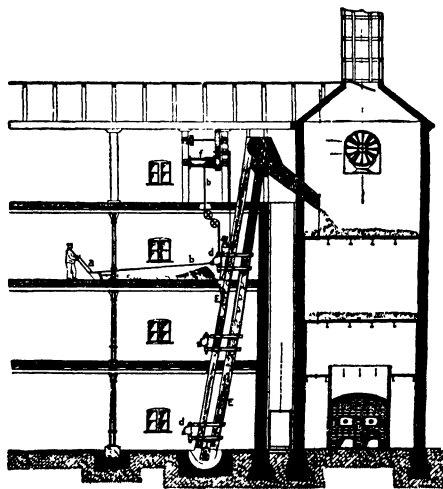
Brewing and Malting. Brewing is the process of making fermented drinks, such as ale, beer, cider, etc. See BEER.

MALTING.—Malting is the preparing of cereals by germination or growth for the process of mashing. Barley is the grain commonly used for making malt for lager beer, ale, stout, vinegar and yeast-makers' or distillers' mash, etc., while wheat malt is used to a large extent in the production of weiss beer.

The barley is first cleaned in order to remove foreign seeds, straw, broken kernels, etc., by means of sieves and blower fans. As the character of the beer depends largely upon that of the malt, and as the latter's character can be determined during malting, it follows that there are various methods of details in malting. The following are the general manipulations employed:

Steeping.—Malting is in reality an artificial or forced growth of a seed, the changes taking place being similar to those when the seed is planted in the soil. The first requisite is moisture. This is given to the grain by placing it in steep tanks containing water of a certain temperature. Steep tanks are cylindrical iron vessels having conical bottoms so that all the grain will drop out when tank is emptied. They are generally placed on the top floor of the malt-house. The grain remains in the steep tank until it has absorbed the desired amount of water, the time differing for different kinds and quality of grain or the process of the maltster. For barley the duration of steeping is generally from 36 to 60 hours, averaging about 48 hours.

Growing or Germinating Floors.—The malt-house usually consists of several floors. The water in the steep tank is drained off and the



Floor Malt House with Power Shovel, and Bucket Elevator for Green Malt.

wet barley dropped upon these floors below. The barley is now spread in heaps of about 12 to 14 inches high (occupying rather more than one third and less than one half of the floor space). The barley now dries out somewhat and begins to sprout or grow and small hair-like fibres, called rootlets, begin to show. As heat is generated during growth, which is undesirable above a certain temperature, and as further

BREWING AND MALTING

proper growth requires pure air, it is necessary to aerate the growing barley (now called green-malt). This is done by what is called "turning the heap," which consists of reshoveling the green malt in such a manner that the lower kernels of the old heap will be at the top in the new heap. (During turning, the green malt is thrown through the air in a thin sheet or stream, whereby it is aerated and cooled. The new heap now occupies a larger floor space, is consequently of less height on the floor.) This turning is repeated at regular intervals so that at the end of the growing period the heap covers the entire floor to a height of from five to six inches. This growth usually takes about five days, during which time water is sprinkled upon the heap whenever it becomes too dry.

Kilning or Drying.—After the green malt shows the desired degree of sprouting, it is necessary to quickly check further growth. This is done by drying it upon the kiln. The green malt is shoveled by means of a power shovel to one end of the floor where it drops through an opening into a bucket elevator and is conveyed to the kiln. The kiln usually has two floors placed one above the other made of strips of wire or perforated sheet metal and heated by means of an open fire from below. Above the upper floor, in the dome, drafts are placed to carry off the vapors, but in modern constructions suction fans are used to promote drying. The green malt is spread evenly upon the upper kiln floor about 18 inches high, where it remains for 24 hours, during which time it is only partially dried. It is now dumped or dropped upon the lower floor (commonly by mechanical dumping floors which turn open in sections on an axis or bearing like the grate in a furnace). The malt on this lower kiln is again spread evenly and then subjected to a higher temperature until the desired degree of dryness is obtained, which usually takes from 20 to 24 hours.

Malt Cleaning.—The malt as it comes from the lower kiln is not yet suitable for brewing as it contains the rootlets and some kernels that were crushed or injured on the floors or during conveying. The malt now passes through cleaning machines consisting of sieves and blowers which remove the rootlets, dust and small and broken kernels.

Mechanical Malting.—As floor malting is restricted to only the cooler months of the year and possesses other disadvantages as to cost of labor and buildings, mechanical systems are coming more and more into use. The steeping of the grain as well as the kiln drying, however, remain generally the same as in the floor system.

Pneumatic Floor Malting.—This system employs box-shaped compartments to hold the grain during the growing period. Through this receptacle air that has been purified and given the proper degree of moisture, as well as cooled or warmed to the proper temperature, is circulated. The conditions of temperature and humidity can thus be made the same all the year round no matter what the conditions of weather may be outside. The green malt in this system is not turned by hand, but by a series of screws or propellers driven by power, traveling through it at regular intervals.

Drum Malting.—The advantages here are similar to those stated above. The drums con-

sist of two concentric cylinders having the same ends. In the space between the cylinders the steeped grain is placed, this space not being filled quite full. The cylinders are perforated with small holes so that moistened or heated or cooled air can be forced through the grain from the centres or sucked through from the outside. By revolving the drum the grain is constantly tumbling, that is, the kernels nearest the inside cylinder fall against the outside cylinder, and this in connection with the air current passing through gives the same turning and aeration to the grain as in turning a heap in floor malting, and requires no labor. There are several systems of malting drums, differing principally in the manner in which the air is warmed and moistened and the direction in which it is forced through the drum.

BREWING.—Brewing Materials.—The materials used in the United States are principally the following: Barley malt is the most important and generally used. It gives to the beer not only its substances, but also to a great extent its character. Malt also supplies peptase and diastase, two substances that change the nature of certain other constituents during mashing. Peptase changes the insoluble albuminoids of the malt into soluble or desirable ones. Diastase changes the unfermentable starch contained in the malt and other materials into fermentable sugars and dextrins.

Caramel and black malt, consisting of ordinary malt that has been treated differently during malting, are used to impart color to the wort in order to produce darker beers, also to impart to the beer a more pronounced malt aroma or flavor. Only a small amount, proportionately, of these are used mixed with other materials.

Malt adjuncts or other starch containing materials, and brewing sugars are used for the triple purpose: of producing more durable beers, since these adjuncts contain very little albumen; of producing paler beers than could be made with malt alone; and for reducing the cost of production. These are rice and corn products, such as corn grits, corn meal, corn starch, corn flakes, and brewing sugars, glucose, etc. Flakes are made by steaming corn grits and passing them through hot steel rollers in order to change them so as to dissolve better during mashing. Flakes and sugars, such as grape sugar, glucose, etc., are sometimes used, instead of corn grits or rice (which require cooking) when a cooker is not installed. Flakes are added directly to the mash in the mash tub, and sugars to the wort in the kettle. Brewing sugars are used to a moderate extent only as a brewing material for lager beers, finding more extended use in the production of English beers such as ale, stout, etc.

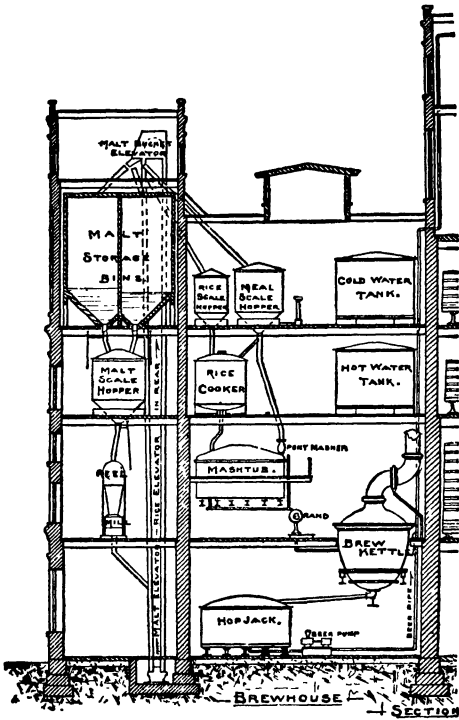
Hops are added to the boiling wort for the purpose of imparting (1) tannin, which aids in the elimination of undesirable albuminoids in the wort; (2) hop oil, which gives the beer its hop aroma, and (3) hop resin, which gives the beer its bitter taste and furthermore tends to preserve it. Water acts as a solvent for the substances contained in the beer. Its composition has considerable influence on the character of the beer produced. It must contain certain mineral substances. See Hops.

Brewing Operations.—Modern breweries are usually divided into three departments, namely,

BREWING AND MALTING

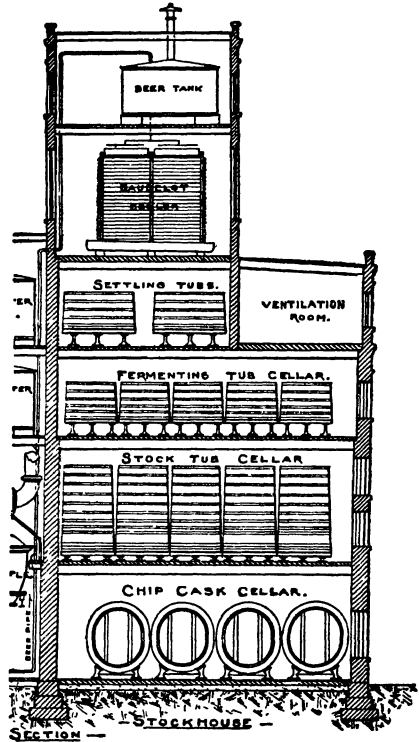
the elevator or mill house where the materials are prepared and weighed; the brew house, where the wort is produced, and the cellars

ferred to the storage hoppers in the brew house ready for use. Rice and corn goods are either stored in the mill house, weighed in bulk and elevated to a storage hopper in the brew house, or dumped (usually in smaller breweries) directly from the sacks into the cooker.



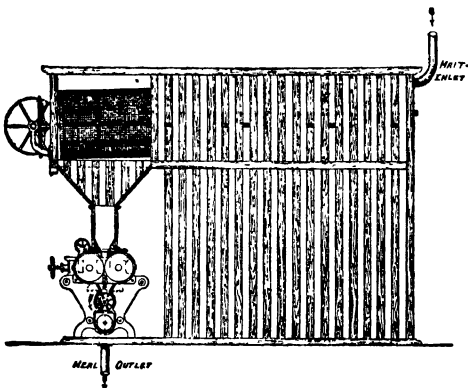
Mill and Brew House.

where the wort is fermented and treated to produce the finished beer. The arrangement is on the gravity plan, that is, in each department the material of wort or beer is elevated or



Gravity or Tower Brewery Cellars.

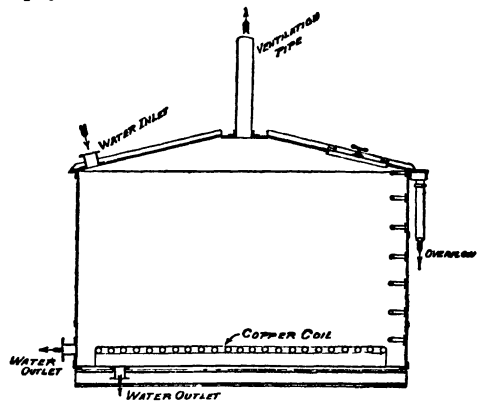
Brew House.—The brew house generally contains the following vessels: hot and cold water tanks; malt and cereal (rice or corn) hoppers; the cereal cooker, mash tub, kettle, and hop jack and cooler.



Malt Mill and Screening Reel.

pumped only once to the top and from there descends through the different stages of manufacture by gravity.

Elevator or Mill House.—Here the malt is cleaned and stored. The desired amount of malt for the beer is weighed out in a scale hopper, and from thence passes through the malt mill where it is crushed so as to loosen the starch in the kernels. The crushed malt is then trans-



Hot Water Tank, Sectional View.

Mashing in Cereal Cookers.—Cookers are of two kinds; open ones or, as they are usually called, rice tubs, and closed or pressure cookers.

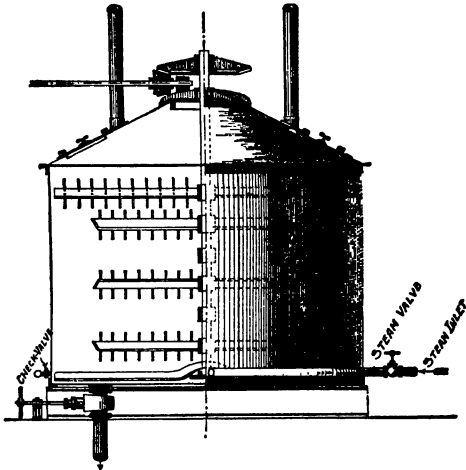
BREWING AND MALTING

In these vessels rice or corn (grits or meal) is boiled for a certain length of time in order to loosen up or soften the hard flinty condition of their starch so as to render it able to be more completely dissolved or acted upon in the mash tub. Crushed malt to the amount of about one quarter the weight of corn goods is added in the open cookers. The mashing method in the

than in open cookers. Hereby a more complete softening or dissolving of the starch is obtained and consequently a better yield or extraction of the materials.

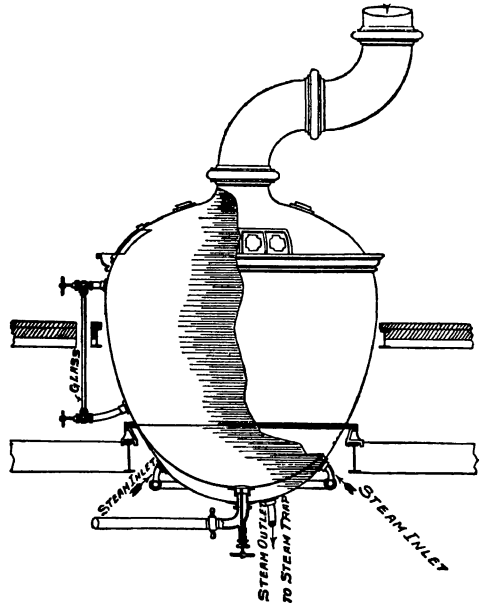
Mashing in Mash Tubs.—The mash tub, like the open cooker, has a stirrer, and a heating coil, but is further supplied with a strainer or perforated false bottom for clarifying the wort, and a sprinkling device or sparger for washing out the grains. In the mash tub the mash is started and, when the mash from the cooker has been added, the combined mash is finished. The mashing method here varies considerably depending upon the character of the beer that is to be produced, and is consequently one of the most important of the brewing operations.

The method of mashing for the production of a beer of average character is approximately as follows: The crushed malt and water are mixed so as to have a temperature of 30° R. (100° F.) and the mash allowed to rest at this temperature

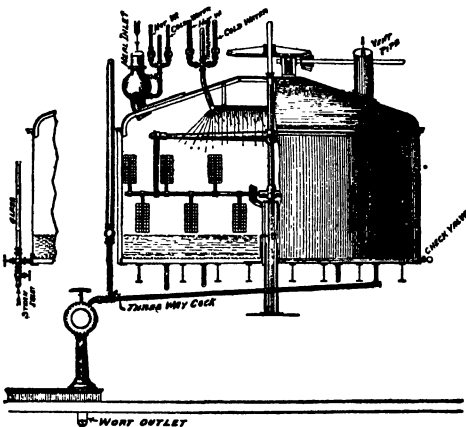


Cooker, showing Stirrer and Steam Connection.

open cooker varies somewhat among different brewers, the following being about the average method: The materials are mixed with water so as to have a temperature of 30° R. (100° F.). The mash is held at this temperature for about 15 minutes then run up to 56° R. (158° F.), and held for 30 minutes, then heated quickly to boiling and boiled from 45-75 minutes for corn goods depending on the fineness of the material, and 30 minutes for rice. The cereal mash is then run down to the mash tub where the mash is finished. Pressure cookers are used to some



Brew Kettle, showing Liquid Gauge, Steam Jacket, and Steam Connections.

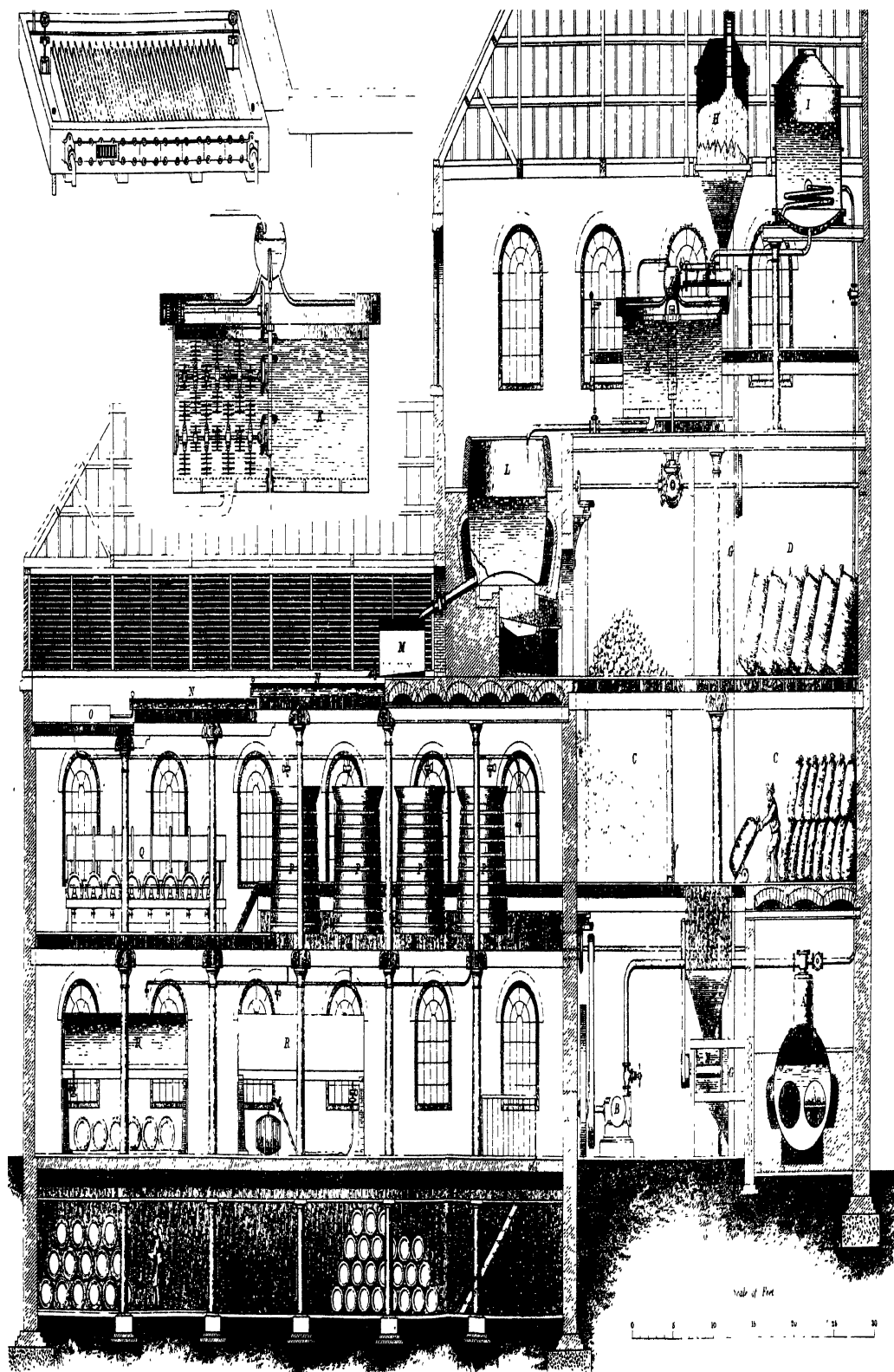


Mash Tub with Foremasher, Liquid Gauge, Attemperating Device and Three-way Cock.

for one hour. The temperature of the mash is now raised to 54° R. (153° F.) to 55° R. (156° F.), in about 15 to 20 minutes, by running in the boiling corn or rice mash from the cooker (with the addition of steam should same be necessary). This temperature is held for 10 to 15 minutes, during which time the stirrer is operated continuously. It is at this stage that the diastase in the malt inverts or changes both the starch contained in the malt as well as that in the corn or rice into unfermentable dextrin and fermentable sugars.

The mash is now heated with steam and hot water, in 15 to 20 minutes, to 59° R. (165° F.) and the stirrer stopped. The mash is now allowed to rest from 30 minutes to one hour in order to allow the hulls of the malt to settle so as to act as a filtering material for the wort, after which the wort is run into the kettle.

extent, but not generally, in American breweries. They differ from the open cookers in that, being closed the mash can be boiled under pressure and consequently, at a higher temperature

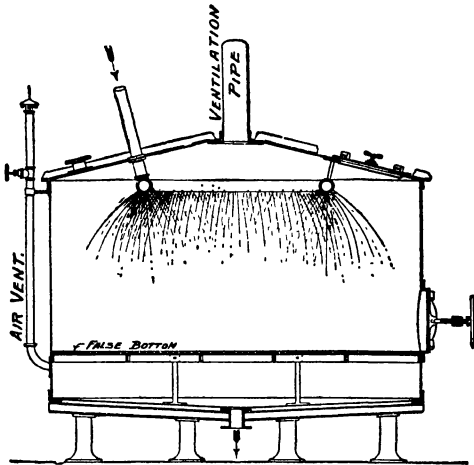


VIEW OF THE INTERIOR OF A BREWERY AT WORK.

BREWING AND MALTING

After the wort has run off, the solid substances remaining in the mash tub, called grains, are washed out or sparged with water in order to recover as much of the wort contained in them as possible. The grains are then thrown out of the mash tub and sold as cattle feed.

Boiling the Wort in Kettle.—The kettle consists of a pear-shaped copper vessel having a double or jacketed bottom for heating the wort,



Hop Jack, Sectional View.

and a vent pipe to roof for conducting off the vapors generated during boiling. The steam outlet of the coil or jacketed bottom is connected to a steam trap which automatically discharges the water condensed in the coil or jacket without materially reducing the pressure of the steam. The wort as soon as it runs clear from the mash tub is collected in the kettle. Steam is turned on in the kettle as soon as the jacketed bottom is covered with wort. This wort, and that continuously running in is then heated to and kept at about 70° R. (190° F.) in order to destroy the action of the diastase and prevent further saccharification in the wort taking place. When the kettle is full or nearly so, steam is further turned on and the wort brought to boiling and boiled for one hour when it should show a good "break." During this boiling the undesirable albuminoids are precipitated in finely divided form, rendering the wort turbid. Upon continued heating these albuminoids unite or lump together and leave the wort between these lumps clear and transparent. This clarification is called the "breaking" of the wort.

Hops are now added, usually about two fifths of the total amount used, after which addition the wort again becomes turbid due to the further precipitation of albuminoids by the tannic acid contained in the hops. After about 40 minutes further boiling the wort should again clarify or show its second break when another two fifths of the hops are added and the wort boiled about 20 minutes. The remaining one fifth of the hops are added and the wort run out of kettle into hop jack immediately. This last quantity of hops is usually of a better quality and is not boiled with the wort as its addition is for the purpose of imparting the hop aroma to the wort. This aroma is due to the hop oil of the hops which is volatile at boiling

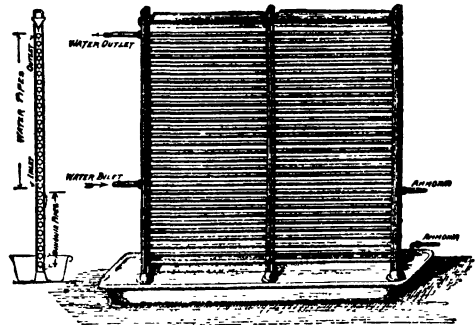
temperature and would escape, and be rendered useless, if the wort were boiled for any considerable time. All or part of this last hop addition is sometimes placed in the hop jack and the boiling wort run upon it.

Wort in Hop Jack.—The hop jack consists of a round or square iron tank, having a perforated false bottom or strainer and a sparger or sprinkler similar to that of the mash tub. The wort, with the hops, is run into the hop jack and allowed to rest until the hops have settled so as to form a filtering material for the clarification of the wort. As soon as this takes place the wort is pumped to the surface cooler or beer tank located at the top of the cellars. After the wort has all been removed the hops are washed out or sparged with hot water in order to recover as much of the absorbed wort as possible.

Surface Cooler and Beer Tank.—The surface cooler consists of a shallow iron pan of a length and width very large in proportion to its depth so as to give the wort as much surface as possible. Hereby the wort is cooled quite rapidly and aerated.

The beer tank, an iron cylindrical vessel closed at the top, is rapidly supplanting this cooler, since the latter, by the large surface it presents, endangers the wort to infections by impurities or germs always more or less present in the air. As soon as the wort on the surface cooler or in the beer tank cools to about 50° R. (145° F.) the danger of its infection by impurities, bacteria, etc., begins. From this stage until the beer is finally marketed, months later, it requires the daily, almost hourly vigilance of the brewer to keep it pure and free from contamination.

Baudelot Cooler.—This consists of a series of pipes or tubes arranged in vertical tiers, over the outside of which the wort flows, while through them the cooling medium is circulated.



Baudelot Cooler.

It is usually made in two sections, the upper being of copper tubes, containing cold water, and the lower of steel containing ammonia.

The Cellars.—The wort after cooling enters the cellars, where it is fermented, stored krausened bunged, fined, filtered, and racked ready for the market.

Fermentation of Wort.—The wort as it comes from the cooler is run into fermenting tubs in which the yeast has previously been placed. Sometimes the yeast is added after the tubs are filled with wort. The yeast, from one to

BREWING AND MALTING

one and a half pounds to the barrel of wort, is usually given, not in its natural state, but first mixed with an equal quantity of wort and thoroughly aerated.

The fermentation now begins. Within 15 to 24 hours white bubbles appear on the surface around the sides of the tub. The wort at this time is covered with a head of thick, lumpy consistency composed largely of albuminoid matter. The whole surface now soon becomes covered with a fine white froth, which soon changes to a frizzled appearance called "kraeusen" stage. The froth head then moves toward the centre, the fermentation becomes more active, the froth head rises higher and becomes darker and the fermentation now passes into the "high kraeusen" stage, generally after about 70 to 80 hours. This stage is maintained for about 48 to 72 hours when the head begins to collapse and deepens in color to the end of the fermentation. The temperature is then gradually reduced by means of cooling attemperators to 3° R. (39° F.) in the next 3 or 4 days. Total duration of fermentation, 10 to 11 days.

Storage of Beer.—After the wort is fermented the beer is filled into storage vats (closed at the top) where it is stored at a temperature near the freezing point for about two or three months. During this storage period there is a slight progress of secondary or after fermentation and the yeast settles, and, what is most important in bottle beer that is to be pasteurized, there is a further precipitation of albuminoids.

Chip Cask Treatment.—When sufficiently matured in storage the beer is run or pumped into the chip casks, so called because in them wooden chips are placed to retain the sediment produced by the finings. In the chip cask, two properties must be imparted to the beer that it did not possess during storage, namely, life or proper amount of carbonic acid gas contents, and brilliancy. Life is given the beer by addition of 8 to 10 per cent of kraeusen, (that is, young beer in the first, or kraeusen stage of fermentation). This when added to the old "flat" storage beer continues to ferment, and, as the casks are closed the gas generated gives life to the whole amount of beer contained.

For bottle beer, kraeusen made from grape sugar is used, as grape sugar contains no albuminoids as does the kraeusen from regular fermenting worts.

Brilliancy is given to the beer by removing the yeast and other particles in suspension by means of finings made from isinglass. After bunging the cask, a certain pressure only (4½-5 pounds) is desired and any excess pressure generated above this is automatically removed by an automatic blow-off device called the bunging apparatus.

Filtration of Beer.—Although beers will generally become clear in the chip cask if they are left there long enough, they are now almost universally filtered after they have become moderately fine (clear) in the chip cask. Thereby much time is saved, also a large part of the finings and chips. Furthermore, filtration furnishes a more brilliant beer than can generally be obtained by chip cask treatment only. Modern beer filters differ considerably in construction, but are all alike in that they contain several or

many compartments or cells filled with filter mass or pulp (a substance similar to blotting paper) through which the beer is forced. The filter mass or pulp can be used again and again, being washed after each use to remove the beer and sediments it collects during filtration. The operation of filtration is as follows: The bunging apparatus is disconnected and air pressure (15 to 20 pounds) is put on the chip cask and the beer thereby forced through the filter.

Racking of Beer.—From the filter the beer passes to the racking bench which must be placed at a higher level in order to cause a back pressure upon the filter and prevent foaming. The racking device consists of two or more faucets of which one is always open so as to give a steady flow of beer.

Carbonating.—Beer is often carbonated. This is the mechanical forcing of carbonic acid gas into the beer by which time, labor, space, and cost of chip casks are saved, besides obtaining a more durable beer.

Pitching and Varnishing.—In order to prevent the beer in wooden vessels from soaking into the wood, they are coated on their insides with an inert or insoluble substance. This is shellac varnish for the large brewery vessels, and pitch for the trade packages.

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BREWING AND MALTING

COMPOSITION OF VARIOUS BEERS AS PER ANALYSIS MADE BY THE WAHL-HENIUS INSTITUTE OF FERMENTOLOGY, CHICAGO, ILL. (FIGURES DENOTE PER CENT.)

AMERICAN LAGER BEERS										Obtained In	
	Time of Analysis	Extract in Beer (apparent)	Extract in original Wort	Alcohol by Weight	Real Extract	Albuminoids	Sugar	Lactic Acid	Ash	Phosphoric Acid	
Average of 15 samples.....	1887	4.53	13.73	3.77	6.46	0.51	2.00	0.16	0.194	0.072	Different States
Average of 88 samples.....	1889	4.85	13.30	3.64	6.21	0.50	1.99	0.11	0.20	.....	" "
Average of 210 samples.....	1890	3.93	13.45	4.01	5.70	0.56	1.20	0.10	0.18	.....	" "
Average of 176 samples.....	1893	3.66	12.53	3.64	5.50	0.390	1.62	.....	.....	.....	" "
Beers from 10 different cities.	A. 1895	3.30	12.35	3.72	4.91	0.41	1.29	0.09	.....	0.066	" "
	B. 1895	4.64	13.04	3.45	6.15	0.39	1.62	0.120	.....	0.058	" "
	C. 1895	4.09	14.23	4.16	5.92	0.44	1.83	0.103	.....	0.060	" "
	D. 1895	2.88	13.62	4.41	4.80	0.45	1.39	0.102	.....	0.069	" "
	E. 1895	3.82	12.46	3.53	5.46	0.37	1.45	0.135	.....	0.075	" "
	F. 1895	2.91	12.18	3.81	4.56	0.33	1.50	0.069	.....	0.053	" "
	G. 1895	4.00	11.93	3.26	5.11	0.48	1.97	0.085	.....	0.068	" "
	H. 1895	4.97	14.57	3.82	6.73	0.46	3.30	0.126	.....	0.075	" "
	I. 1895	3.12	13.45	4.25	4.95	0.33	1.50	0.073	.....	0.060	" "
	J. 1895	3.37	13.10	4.00	5.10	0.35	1.25	0.054	.....	0.060	" "
Average of 247 samples.....	1896	3.60	12.93	3.82	5.29	0.46	1.62	0.101	.....	0.068	" "
Canadian lager.....	1900	3.15	12.1	3.77	4.88	0.01	1.13	0.072	.....	0.063	" "
Mexican lager.....	1900	3.37	12.51	3.77	4.97	.....	1.61	.....	.....	.....	" "
Mexican lager.....	.....	.....	13.27	4.01	5.25	0.5	1.114	0.124	0.203	0.089	" "
Some typical American tonics.	A. 1895	7.82	17.27	3.88	9.51	0.63	3.87	0.208	.....	0.105	" "
	B. 1896	13.74	18.74	2.66	14.62	0.85	9.84	0.113	.....	0.140	" "
	C. 1896	7.41	20.78	5.50	9.78	0.64	4.94	0.180	.....	0.107	" "
	D. 1896	5.23	17.01	4.87	7.27	0.51	2.60	0.090	.....	0.085	" "
	E. 1896	5.47	16.86	4.69	7.48	0.88	2.87	0.212	.....	0.129	" "
	F. 1896	7.58	17.46	4.06	9.54	0.77	0.96	0.288	.....	0.155	" "
	G. 1896	8.20	21.70	5.60	10.72	1.26	3.58	0.216	.....	0.144	" "
Some typical Am. temperance beers.	A.	2.15	6.66	1.88	3.05	0.18	0.85	0.063	.....	0.03	" "
	B.	5.50	8.31	1.22	6.07	0.09	2.55	0.036	.....	0.02	" "
	C.	3.27	6.66	1.44	3.90	0.19	2.55	0.025	.....	0.025	" "
	D.	1.95	6.55	1.94	2.80	.....	.....	.....	.....	.....	" "

ALES, PORTERS, STOUTS AND AMERICAN WEISS BEERS										Obtained In	
	Time of Analysis	Extract in Beer (apparent)	Extract in original Wort	Alcohol by Weight	Real Extract	Albuminoids	Sugar	Lactic Acid	Ash	Phosphoric Acid	
Allsopp's India Pale Ale, Red Hand.....	1901	2.23	15.14	5.44	4.70	0.44	0.66	0.144	.....	0.045	Chicago.
McEwen's Sparkling Ale.....	1901	3.35	21.02	7.80	6.65	0.85	2.67	0.378	.....	0.0765	" "
Wm. Younger & Co.'s Sparkling Ale, Monk Brand.....	1901	1.87	18.03	6.84	4.90	0.64	0.80	0.153	.....	0.067	" "
Olde English Ale, Dog's Head bottling.....	1901	3.92	24.39	8.75	7.59	0.91	1.60	0.162	.....	0.0855	" "
American Stock Ales, average of 9 samples.....	1896	3.21	16.73	5.55	5.64	0.46	1.81	0.256	.....	0.061	" "
American Cream Ale.....	1901	2.25	13.60	4.75	4.45	0.37	1.06	0.144	.....	0.04	" "
American Sparkling Ale.....	1899	3.98	13.08	4.08	5.82	0.40	1.52	0.135	.....	0.06	" "
American Sparkling Ale.....	1901	2.15	13.80	4.90	4.40	0.38	0.91	0.135	.....	0.04	" "
American Pale Ale.....	1900	3.50	13.05	4.01	5.35	0.37	1.34	.....	.....	.....	" "
Canadian Stock Ale.....	1900	3.20	14.45	4.75	5.30	0.51	1.30	.....	.....	.....	" "
<i>Stouts.</i>											" "
Guinness' Extra Bottled Foreign Stout, white label.....	1901	3.40	18.22	6.29	6.15	0.75	0.97	0.243	.....	0.108	" "
American Brown Stout.....	1900	5.45	18.15	5.37	7.83	0.56	2.06	.....	.....	.....	" "
<i>Porters.</i>											" "
American Porter.....	1899	2.95	13.25	4.19	4.87	0.40	1.49	0.135	.....	0.061	" "
Canadian Porter.....	1900	4.00	14.30	4.37	5.91	0.53	1.31	0.162	.....	.....	" "
<i>American Weiss Beers.</i>											" "
American Weiss Beer.....	1900	2.52	9.20	2.85	3.82	0.57	1.00	.....	.....	.....	" "
Weiss Beer.....	1901	2.24	9.28	2.97	3.58	0.42	0.91	0.342	.....	0.036	" "

GERMAN, AUSTRIAN AND BOHEMIAN EXPORT BEERS										Obtained In	
	Time of Analysis	Extract in Beer (apparent)	Extract in original Wort	Alcohol by Weight	Real Extract	Albuminoids	Sugar	Lactic Acid	Ash	Phosphoric Acid	
Pilsener, Bürgerliches Bräuhaus... ..	1901	3.43	12.83	3.05	5.25	0.42	1.29	0.099	.....	0.063	Chicago.
Pilsener, Genossenschafts-Brauerei.....	1901	4.61	14.29	3.07	6.48	0.52	2.15	0.108	.....	0.085	" "
Pilsener, Anton Dreher.....	1901	2.42	10.80	3.52	4.05	0.34	1.00	0.072	.....	0.050	" "
Thüringer.....	1895	3.45	12.59	3.76	5.07	0.41	1.67	0.09	.....	0.08	" "
Nürnberg, Tucher.....	1895	5.15	.....	4.31	7.07	0.51	2.06	0.135	.....	0.095	" "
Brauhaus Würzburg Export Beer.....	1901	5.35	15.03	4.07	7.22	0.47	2.13	0.099	.....	0.0675	" "
Kulmbacher.....	1887	4.50	15.36	4.48	6.80	0.44	1.77	0.24	0.29	0.08	" "
Muenchener, Löwen Brauhaus.....	1901	4.13	13.53	3.95	5.95	0.44	1.57	0.090	.....	0.050	" "
Muenchener, Pschorr.....	1895	6.12	.....	3.47	7.61	0.46	2.69	0.168	.....	0.08	" "
Muenchener, Pschorr Brau.....	1901	4.40	13.26	3.72	6.12	0.41	1.72	0.072	.....	0.054	" "

BREWING INDUSTRY IN AMERICA

Brewing Industry in America. Before the use of written words the lips of our Aryan ancestors articulated a sound which expressed for them food and drink, and the source from which these things came. This source was the bearded barley of the Himalayas. The porridge and the bread of the Aryans, made from the first grain used for common food, were the crudest forms from which has sprung the brewing industry. It was not until the Sanskrit writers, in their earliest record of the living language, drew the distinction, that separate words were used to express barley, bread, and beer; and even now a sensitive ear will catch the similarity in these three words, which, though much changed from their Aryan prototypes, still have a musical resemblance which tells us of the kinship of the three. The story of beer is therefore as old as the story of humanity.

In the most remote antiquity the Egyptians brewed, as did the Assyrians, and later the Greeks and Romans; and from time immemorial the Teutonic races have been famous for their skill in the production of the beverage for which they praise to-day, in poem, prose, and story, in song, and eulogy, the name of the very modern but acknowledged patron saint of brewing, Gambrinus. The word for beer has been preserved, as the art of brewing has been developed, by the Teutons. The Egyptians called beer *zythum*, and the Greeks and Romans, *cervisia*; but the word "beer" in some form has always been used to express to the Teutonic mind the ancestral beverage.

While the written history of brewing begins with Egypt, and the development of the art of brewing should properly be accredited to the Teutons, to America must be credited the attainment of scientific perfection in the craft, which, like mathematics, has become in the United States practically a finished science. When the Pilgrim Fathers landed on Plymouth Rock they brought with them from England, in addition to the fiery potables they were wont to drink,—“and not a man afraid,”—some of the sturdy brew of “merrie England,” and also a knowledge of the brewer’s craft, which they soon turned to practical use in the land of their adoption.

The Dutch settlers of New Amsterdam, with their long clay pipes puffing clouds of blue smoke, were wont to sip from generous tankards the beer of the Netherlands, and crack their jokes around the tavern table, the while they grew fat, sleek, and jolly under the gentle influence of their beneficent national beverage. Good William Penn found solace in the brew made under his direction for his young, peaceful, but aspiring colony; and farther south, in old Virginia, many were the happy gatherings where harmony prevailed, and memories of their old home far across the sea rose through their companionable chat, like the foam upon the treasured musty ale.

In New England, where the stronger spirits most prevailed, our good forefathers passed a law granting immunity from taxes and a prize in money to that energetic brewer who should brew in a single year more than 500 barrels of honest beer; for, said they, not only does this peaceful beverage add to the prosperity of the farmer by giving him a market for his grain, but, by supplying to our worthy citizens a bev-

erage of much milder form, adds much to the temperance and good order of Massachusetts Colony. So peacefully, with full approval, and yet with growth most unfortunately slow, an infant industry was formed, which in 1795 produced upward of 2,000,000 gallons.

Legislative enactment, in the varying application of intelligence and ignorance, liberality and fanaticism, has, since the days of the Egyptians, hampered or caused the expansion of the brewing industry. While, prior to 1795, it does not appear that legislation adverse to the brewing industry was enacted, legislation favorable to the cheaper distribution of distilled liquors brought the more potent beverages to the front, and held in check the brewing industry, which would otherwise have proved itself more powerful in promoting temperance than any organized legislative effort. During the administration of Washington, Congress, in considering the very first federal revenue law, was impelled by consideration of public morality to take cognizance of the importance of fostering the brewing industry. But opposition from various quarters arose. In 1789 Madison expressed the hope that the brewing industry would strike deep root in every State in the Union, and Thomas Jefferson gave expression to the opinion that “no nation is sober where the dearthness of fermented drinks substitutes ardent spirits as a common beverage.”

In 1810 the domestic production of malt liquors amounted to 5,754,735 gallons. There were only 129 breweries in this country, most of them producing ale and porter exclusively. In 1847 the increasing German immigration brought into America not only a demand for their favorite beverage, lager-beer, which gave a new impetus to the trade, but also a practical knowledge of the craft; and lager-beer breweries began to spring into existence wherever a sufficient number of Germans had settled to make these little local establishments possible. Americans sniffed suspiciously at this form of beer, which was new to them, and allowed difference in race to prejudice them against what was destined to be their national beverage. Owing to the greater popularity of lager-beer, the production of ale and porter at the present time does not exceed 1,000,000 barrels. Long before German immigration had assumed any noteworthy proportions the wisest and most patriotic statesmen of our country were so alarmed at the increased use of fiery intoxicants that they would have resorted to any legitimate means to force breweries into existence.

It remained for the exigencies of the great Civil War to bring forth such excise measures as should put the lighter beverages prominently to the front. Heroic measures were taken to raise the revenue and save the government from impending disruption. The internal revenue laws came into existence. These threw the burden of taxation heavily upon ardent spirits. The passage of these laws in July 1862 was practically the beginning of the development of the present vast brewing industry. It was like the breath of new life, and the extraordinary advancement of brewing from that day to this has been a surprise and wonder to all who have watched its history.

It was in 1862 that the Brewers’ Association was formed. A moving cause in its organization was a desire for self-protection, and yet the fundamental principle which brought the Ameri-

BREWING INDUSTRY IN AMERICA

can brewers together was patriotic, for they associated for the purpose of jointly aiding the government in perfecting the revenue laws relating to malt liquors, enforcing by their moral influence the collection of the revenue without discrimination, and of securing themselves by organization against unjust treatment. To its credit be it said that the Brewers' Association has never lost sight of its fundamental purpose. Born in the throes of the great struggle for national unity, it has served the government faithfully and well, and, instead of criticism and opposition, it has evinced sympathy and co-operation in the efforts of the government to establish proper internal revenue laws, and has willingly acquiesced in the payment of this species of taxation.

The War of the Rebellion also brought about a remarkable revulsion of feeling in regard to our foreign population and their customs, especially as to the Germans and beer drinking. When the war put the patriotism of the people to a crucial test, the Germans were found among the first to rush to arms in defense of our country. Old prejudices vanished before the bond of sympathy soon warmly established, like mist before the sun. This brotherhood established by the Rebellion has never died out, but has constantly grown stronger, and has cemented us together as one race. We have contributed to one another many of our habits and peculiarities, many of our customs.

The production of beer from the year 1863, expressed in barrels, is as follows:

YEAR	Number of barrels	YEAR	Number of barrels
1863.....	2,006,625	1882.....	16,952,085
1864.....	3,141,381	1883.....	17,757,892
1865.....	3,657,181	1884.....	18,988,619
1866.....	5,115,140	1885.....	19,185,953
1867.....	6,207,402	1886.....	20,710,933
1868.....	6,146,663	1887.....	23,121,526
1869.....	6,342,055	1888.....	24,680,219
1870.....	6,754,617	1889.....	25,119,853
1871.....	7,740,260	1890.....	27,561,944
1872.....	8,659,427	1891.....	30,478,192
1873.....	9,963,323	1892.....	31,817,836
1874.....	9,600,897	1893.....	34,554,117
1875.....	9,452,697	1894.....	33,334,783
1876.....	9,902,352	1895.....	33,561,411
1877.....	9,810,060	1896.....	35,826,098
1878.....	10,241,471	1897.....	34,423,094
1879.....	11,103,084	1898.....	37,493,306
1880.....	13,347,111	1899.....	36,581,114
1881.....	14,311,028	1900.....	39,330,849

These statistics, showing a development in the last century from 2,000,000 gallons in 1795 to 1,258,587,168 gallons in the year 1900, speak more eloquently of the marvelous advance than glowing language. There are now 2,200 brewing establishments, by far the greater number making the lager-beer of the Germans. They range in magnitude from the little home brewery of some German garden to the gigantic business enterprise with an annual output exceeding 1,000,000 barrels. In the earlier years brewing was carried on exclusively for local markets. Within the last 30 years, however, the shipment of beer in barrels from one point to another began, and now train-loads of the delectable, foam-capped beverage leave the great shipping cities daily. The capital invested in brewing in the United States is about \$415,284,468 (1900). The value of the annual output of the industry is \$237,269,713. It contributes to the support

of the United States government, in internal revenue taxes alone, over \$33,000,000. The local taxes paid by it aggregate over \$3,000,000 more. The development of the bottling of beer from nothing to a business, which in one brewery alone amounts to over 42,000,000 bottles annually—mostly quarts—is a remarkable evidence of growth. Over 50,000 men are directly engaged in the brewing of beer in the United States.

These material manifestations of progress by the mere aggregation of figures are based upon a deeper and broader advance in the application of science to the art of brewing. The establishment of brewers' schools, where theory and practice could be brought into constant association, where experiments could be conducted, and where a thorough training could be given to brewers' sons, who, with an inherited tendency to skill in the art of their forefathers, desired to equip themselves with a higher knowledge of the craft, has brought into the field of competition a skill in the manipulation of the various processes of the brewing industry which has made possible a greater advance in the art of brewing since the year 1870 than had occurred from the time of Queen Elizabeth and the days of Shakespeare's Falstaff.

Only 40 years ago the principles governing the production of beer were, as we see, essentially unchanged. The interval of 70 years from 1795 had brought no noticeably valuable advances in the art. While it is true that chemistry, physiology, and botany, and, above all, the science of mechanics, passed through great development during the first half century, it apparently meant nothing for the art of brewing save a thorough and necessary preparation of the various factors which were to be the foundation on which should rest the subsequent extraordinary progress—a progress destined to make brewing one of the most delicately scientific arts of manufacture. During the last quarter of a century, however, the brewing industry, taking advantage of every development of modern analytical investigation and mechanical advance, has been subject to radical improvements in all directions. It is especially indebted to Pasteur, Naegeli, Hansen, Lintner, and Delbrueck, who have contributed immeasurably to the creation of the higher art of brewing.

The dawn of an unsuspected and unparalleled line of improvement in the science of brewing, considered especially with reference to the physiology of fermentation, appeared with the labors of Pasteur, published to the world in his 'Etudes sur la Biere' in 1876, in Paris, and later with those of Hansen at Copenhagen, concerning the physiology of the organisms of fermentation. From time immemorial beer had been known as a perishable product, but the causes leading to its spoiling were shrouded in deep mystery. Pasteur proved that the diseases of beer might be traced to the growth of injurious organisms, especially bacteria, and indicated the ways and means of preventing these diseases through the application of a rational process of wort cooling and fermentation. Hansen advanced an important step farther by proving that the brewer's yeast might become, by contact, under given circumstances, with similar organisms closely resembling it, more injurious than bacteria. He crowned his labors by developing and introducing a process of cultivating yeast, in absolute purity and in large quanti-

BREWING STATISTICS

ties, from a single germ, thereby also preventing the introduction of wild yeast into the beer. These improvements were soon applied upon a large scale in the leading breweries of the United States, and brought about material changes in their practical operation. After the principle of preventing infection had once been proclaimed, the old-fashioned open cooler was replaced by a suitable closed apparatus, often ingeniously constructed, which came up to the highest requirements of the new science. Closely connected with this was the use of filtered air, rendered germ-free, and of sterilized water, so that to-day the product of the brewer's art, in its highest and ideal perfection, is absolutely protected against infection. From the moment it leaves the brew-kettle, passes over the coolers, and through the process of fermenting and lagering, and up to the moment when it is served as a refreshing and perfect beverage, perhaps thousands of miles from the place of its production, it is protected by constant, accurate, and effective scientific safeguards. See BREWING and MALTING.

Physiology and theoretical chemistry, hand in hand, have made brilliant progress in the science of brewing. The most complicated processes in the malting of barley, in mashing, and also in fermentation, have been thoroughly explored and have come to be perfectly understood during the last few decades, and have laid solid foundations for the activity of the maltster and the brewer. An important place in this connection must be assigned to an invention which has brought about more radical changes in the brewery than any other, and which alone had made possible the introduction of numerous other improvements and innovations. This invention is the ice-machine and the application of artificial refrigeration upon a large scale. Hardly 30 years ago the imperfect ice-machine of Carré, a Frenchman, was considered a curiosity, while to-day the model machines of Linde and De la Vergne are common property of all the brewers.

Americans may now justly claim to produce in the United States, not only the best beer, but, as is acknowledged by European authorities, the most durable beer, in the world. It is a peculiar, although incontrovertible fact, that the latest scientific theories of brewing, credit of which belongs to European investigators, have always found the most rapid and complete application and introduction in practice in this country. Prof. Delbrueck, of Berlin, and Prof. Schwackhoefer, of Vienna, who were sent to America in 1893 by their respective governments as authorities upon brewing, for the purpose of studying American breweries, were agreed in acknowledging this fact, and in their official reports did honor to the American brewing industry as they had found it. We have particular reason to be proud of the fact that a special process of fermentation which has been in use in this country for years has recently been proved by Prof. Delbrueck to be the most rational process, judged from a scientific standpoint. This shows clearly to what an extent the theories of European investigators have been practically applied in this country before they were ever practically adopted abroad.

It would be going too far to recount all the different improvements to which the science of brewing has led us within the last few years. But there is one innovation that deserves to be mentioned, which has attracted attention of late,

and which had its origin in our own country. This is the collection and utilization in its purity of the carbonic-acid gas formed during the process of fermentation. This process makes it possible to abandon the former "krausen" process, the old-fashioned method of carbonating. The finished product may now be charged with the finest natural carbonic-acid gas. This collection of the by-product of fermentation produces such a superabundance of carbonic-acid gas that it may readily be liquefied, and is destined to crowd out of the market all other products of its kind. Americans have reason to be proud of this achievement, because the solution of the problem had been attempted in vain by European authorities for many years.

Careful investigation of the methods of foreign brewers, taking the American method of perfect brewing as a standard, has forced the writer to certain conclusions which, as an American, he is proud to hold: First, that while the deep, analytical, concentrated, and tireless mind of foreign, and especially German, scientists may, by more painstaking and patent application, have attained for the world a better knowledge of the fundamental theories on which success in the art of brewing should rest, it took the broader grasp, the more nimble and daring intelligence of the American mind, and the tremendous energy of American enterprise, to put these theories into practical operation; second, there is an overwhelming difference in advanced methods to the credit of the American; third, the American schools of brewing are now in the very van of scientific progress, and even if equalled, are certainly not surpassed in the higher technical instruction which they give.

FRED PABST,

President, Pabst Brewing Co.

Brewing Statistics. The total number of breweries in the world in 1900 was 42,185, with an annual output of 235,496,470 hectoliters of beer.

BEER PRODUCTION, 1900.

COUNTRIES	No. of Brew-eries	Hectoliters
German Empire.....	21,236	61,478,433
Great Britain and Ireland.....	8,190	57,825,095
United States.....	2,108	48,478,043
Canada, Australasia, Central and South America and Mexico.....	.....	14,278,239
Austria-Hungary.....	1,662	20,823,353
Belgium.....	3,057	10,364,816
France.....	2,546	9,248,814
Russia.....	1,136	4,802,726
Denmark.....	324	1,854,048
Switzerland.....	304	1,802,961
Sweden.....	540	1,521,720
Netherlands.....	428	1,326,860
Norway.....	47	632,950
Roumania.....	17	.....
British India.....	39	411,260
Luxembourg.....	13	154,620
Spain.....	36	85,865
Italy.....	89	78,307
Greece.....	71	81,715
Bulgaria.....	21	57,867
Servia.....	12	62,958

The sales of beer in the principal cities of the United States in 1900 were as follows: New York, 4,918,808 barrels; Chicago, 3,198,322; Milwaukee, 2,222,818; Saint Louis, 2,070,331; Philadelphia, 1,996,743; Brooklyn, 1,026,828; Cincinnati, 1,217,343; Newark, 1,227,506; Boston, 1,224,524.

BREWSTER — BRIALMONT

Brewster, Benjamin Harris, American lawyer: b. Salem County, N. J., 13 Oct. 1816; d. Philadelphia, 4 April 1888. He graduated at Princeton in 1834, was admitted to the Philadelphia bar (1838), and for nearly half a century practised with ardor and success the profession he loved. In 1846 he was one of a commission to adjudicate the claims of the Cherokee Indians against the United States; in 1867 he became attorney-general of Pennsylvania, and in December 1881 President Arthur made him attorney-general of the United States. Shortly after the death of President Garfield, Attorney-General Wayne MacVeagh retained Brewster to assist in the prosecution of the "Star Route" conspirators. In boyhood he was severely injured by burns received while bravely attempting to rescue his sister from a fire into which she had fallen. He was an impressive orator, and possessed scholarly attainments of a high order. Both Princeton and Dickinson colleges conferred the degree of LL.D. upon him.

Brewster, Chauncey Bunce, American bishop: b. Windham, Conn., 5 Sept. 1848. He is a direct descendant of Elder Brewster of Plymouth Colony fame. He graduated at Yale in 1868, Berkeley Divinity School, 1872, and was ordained priest, 1873. He was rector of Christ Church, Rye, N. Y., 1873-81; Christ Church, Detroit, 1881-5; Grace Church, Baltimore, 1885-8; Grace Church, Brooklyn, N. Y., 1888-97. On 8 June 1897 he was elected coadjutor-bishop of Connecticut, and consecrated in New Haven, 28 Oct. 1897. Upon the death of Bishop Wilhams, in 1899, Bishop Brewster became diocesan of Connecticut. Beside sermons and pastoral charges, he has written 'The Key of Life' (1885); 'Good Friday Addresses' (1894); 'Aspects of Revelation' (1901), being the Baldwin lectures before the University of Michigan. Yale and Trinity colleges, have conferred the degree of D.D. upon him.

Brewster, Sir David, Scottish natural philosopher: b. Jedburgh, 11 Dec. 1781; d. Allerly, near Melrose, 10 Feb. 1868. He entered the University of Edinburgh, where the lectures of Robison and Playfair attracted him to scientific pursuits. His first investigations were on the subject of the polarization of light, upon which he communicated some important observations to the 'Transactions of the Royal Society of Edinburgh.' In 1808 he became editor of the Edinburgh 'Encyclopedia,' to which he contributed a number of valuable articles. In 1816, while repeating the experiments of Biot on the action of fluids on light, he made those observations which resulted in the invention of the kaleidoscope. In 1819, in conjunction with Jameson, he founded the Edinburgh 'Philosophical Journal,' of which he was sole editor (1824-32). Brewster was one of the founders of the British Association, whose first meeting was held at York in 1831, and he presided over it on the occasion of its 20th meeting, held at Edinburgh in 1850. In 1832 he received the honor of knighthood along with a pension from the government. Both before and after this time his services to science obtained from many quarters the most honorable recognition. The French Institute, of which he had been a corresponding member since 1825, appointed him one of its eight foreign associates, 4 Jan. 1849,

and he was also among the members of the academies of St. Petersburg, Berlin, Vienna, Stockholm, and Copenhagen. From Prussia he received the Order of Merit in 1847, and in 1855 the cross of an officer of the Legion of Honor was bestowed on him by Napoleon III. From 1838 to 1859 he was principal of the united colleges of St. Leonard's and St. Salvador at St. Andrews, and in the latter year he was unanimously chosen principal of the University of Edinburgh—an office which he continued to hold till his death. His chief works are: 'Treatise on the Kaleidoscope'; 'Letters and Life of Euler'; 'Letters on Natural Magic'; 'Treatise on Optics'; 'Martyrs of Science'; 'More Worlds than One'; 'Memoirs of the Life, Writings, and Discoveries of Sir Isaac Newton' (1855); besides numerous communications to the Royal Societies of London and Edinburgh, contributions to the 'Encyclopedia Britannica,' the Edinburgh and North British 'Reviews,' and other periodicals.

Brewster, Frederick Carroll, American lawyer: b. Philadelphia, Pa., 15 May 1825; d. Charlotte, N. C., 30 Dec. 1898. He graduated at the University of Pennsylvania, read law with his father, and was admitted to the Philadelphia bar, 1844, of which he became a leader and one of its brightest ornaments. He was elected city solicitor (1862); judge of the court of common pleas (1866-9); attorney-general of the State (1869-70). He was successful as counsel in the famous Stephen Girard will case, and secured the decision in the Chestnut Street bridge case, wherein a decree was entered in the United States supreme court allowing the city of Philadelphia to cross the Schuylkill River by bridge. He published 'Reports of Equity, Election, and other Cases in the Courts of the County of Philadelphia' (1869); 'Digest of Pennsylvania Supreme Court Cases' (1869); 'Brewster's Blackstone, with Annotations of Decisions on the Rule in Shelly's Case' (1887); 'A Treatise on Practise in the Pennsylvania Courts' (1887-8).

Brewster, William, elder of the Plymouth pilgrims: b. Scrooby, England, 1560; d. Plymouth, Mass., 16 April 1644. He was educated at Cambridge, and entered the service of William Davison, ambassador in Holland, but presently retired to Scrooby manor house in Nottinghamshire, where his attention was chiefly occupied by the interests of religion. He was one of the company who with William Bradford attempted to find an escape to Holland, and were thrown into prison at Boston. Having obtained his liberty, he first assisted the poor of the society in their embarkation, and then followed them to Holland. Here he opened a school at Leyden, for instruction in English, and also set up a printing press. He was chosen a ruling elder in the Church at Leyden, and came to New England in 1620 with the first company of the Pilgrims. Until 1629 the principal care of the Church at Plymouth devolved upon him, though, as he was not a regular minister, he could never be persuaded to administer the sacraments. See Steele, 'Chief of the Pilgrims'; 'Life of William Brewster' (1857).

Brewster's Law. See LIGHT.

Brialmont, Henri Alexis, ōñ-rē ä-lĕk-sē bre-al-mōñ, Belgian military writer: b. Venló, 25 May 1821. He entered the army in 1843 as

lieutenant of engineers, and in 1877 became lieutenant-general. Among his works are 'Considérations Politiques et Militaires sur la Belgique' (1851-2); 'Précis d'Art Militaire' (1850); 'Histoire du Duc de Wellington' (1856), translated into English by Gleig; 'Etudes sur la Défense des Etats et sur la Fortification' (1863); and many works on fortification. He has fortified Namur, Bucharest, Liège, and other places.

Bri'an (surnamed **BOROIMHÉ** or **BORU**): b. 926; d. 23 April 1014. He figures in early Irish annals as a celebrated chieftain, and son of Kennedy, king of Munster. He succeeded to both Munsters, nearly identical with counties Tipperary and Clare, in 978. Having defeated the Danes of Limerick and Waterford, he turned his arms against O'Maclachghlin, or Malachi, who had a nominal supremacy over the whole island, and became king in his stead, levying tribute, or *boroimhé*, from which circumstance he derived his surname from the rulers of all the different provinces. He distinguished himself as much in peace as in war, contributed greatly to the progress of civilization, and made many internal improvements. He fell at Clontarf, after gaining a signal victory over the Danes, who had leagued with a revolted chief called Maelmora.

Briançon, **Charles Julien**, *shārl zhū-lē-ān brē-ān-shōn*, French mathematician: b. Sèvres, 1785; d. 1865. Besides some important papers contributed to French mathematical journals, he has left small treatises on lines of the second order (1817), and the application of the theory of transversals (1818). He is best known by a theorem, the correlative of Pascal's which he published in 1806. The theorem is: If a hexagon is circumscribed to a conic, the straight lines joining the three pairs of opposite vertices are concurrent.

Briançon, *brē-ān-sōn*, a town in France, in the department of Hautes-Alpes, on the right bank of the Durance, 35 miles northeast from Gap, and near the Italian frontier. It is a fortress of the first class, occupying an eminence at the foot of the Col de Genève, 4,284 feet above the level of the sea, and has sometimes been called the Gibraltar of the Alps, forming, as it does, a central point from which troops can be marched to all their most important passes. Briançon is a town of great antiquity. According to Pliny it was founded by the Greeks. Pop. (1896) 7,177.

Briansk, *bryānsk*, a town in Russia, in the government of, and 70 miles west-northwest from Orel, on the right bank of the Desna. It is surrounded with an earthen rampart, contains 16 churches, a monastery, with a seminary, and two poorhouses. It has a considerable trade in grain, hemp, hemp-oil (sent to St. Petersburg and Riga), honey, and wax; and in linen, cables, and cordage, ironware, bark, mats, lime, and tar, which are sent to Kherson, Odessa, and other parts of the Black Sea. It contains imperial building-yards, for which the oak forests in the neighborhood supply material. Near it are a cannon-foundry and a manufactory of small arms. Pop. (1897) 23,520.

Briare, *brē-ār*, a town of France, in the department of Loiret, on the Loire, 25 miles south of Montargis. The canal, to which the

town is indebted for its importance, is the oldest work of the kind in France, having been begun in the reign of Henry IV., though it was not finished till 1740. It establishes, by means of its junction with the canal of Loing at Montargis, a communication between the Loire and the Seine, and conveys the various products of the province, watered by the former, to Paris.

Briareus, *bri-ā're-ūs* (also called *ÆGÆON*), a giant with 100 arms and 50 heads, the son of Uranus and Gæa. His two brothers, Cottus and Gyes, were formed in a similar manner, and their formidable appearance struck their father with such terror that he imprisoned them at their birth in the bowels of the earth. In the war with the Titans Jupiter (Zeus) set them free, and by their assistance gained the victory. When Juno, Neptune, and Minerva conspired to bind the sovereign of the gods, Thetis brought Briareus from the depths of the sea (how he came there is not known) to the relief of the trembling Jove. Virgil places Briareus in the vestibule of hell. He was employed with his hundred-handed brothers in watching the Titans in Tartarus. Various other fables are told of these gods, who are supposed to be personifications of the extraordinary phenomena of nature manifested in volcanoes, earthquakes, and other commotions.

Bribe, a reward given to a public officer or functionary, to induce him to violate his official duty for the benefit or in compliance with the wishes of the party by whom or on whose behalf the bribe is given or promised. Bribery, at common law, is the receiving or offering any undue reward by or to any person whomsoever, whose ordinary profession or business relates to the administration of public justice in order to influence his behavior in office and to incline him to act contrary to his duty and the known rules of honesty and integrity. Certain writers limit bribery at common law to persons concerned in the administration of justice. The offense is much broader than this according to the weight of authority. It is said by Bishop to be the voluntary receiving or giving of any thing of value in payment for an official act done or to be done, and that it is not confined to judicial officers or other persons concerned in the administration of justice, but that it extends to all officers connected with the administration of the government, executive, legislative, and judicial, and under the appropriate circumstances, military. In nearly all of the States of the American Union, however, the offense is now defined by statute, so that a resort to common law is not often necessary, except for general principles. Bribery may be committed with respect to officers *de facto* as well as officers *de jure*. The offense of the giver and of the receiver of the bribe has the same name. For the sake of distinction, that of the former—that is, the briber—might be called active bribery; while that of the latter—that is, the person bribed—might be called passive bribery. The thing offered or accepted need not be money, but may be property, services or anything else of value. It must be of some value, but as the essence of the offense is its tendency to prevent justice in any of the departments of government, executive, legislative, or judicial, the degree of value of the bribe is not essential. It has been held, however, in Indiana, under a statute prohibiting the giving or receiv-

ing anything of value, that an officer who received a note could not be convicted, because the note, not being enforceable, was of no value.

At common law and under the statutes, in order to constitute bribery there must be a corrupt intent to influence the officer or other person, or on his part, to be influenced, in the discharge of his official duties. It is not essential, however, unless specially required by a statute, that the act induced, or sought to be induced, shall favor, aid, or benefit the person giving the bribe himself. The act which is induced or sought to be induced by the bribe must be an act in discharge of a legal duty. It is not bribery if the act is in discharge of a mere moral duty. Bribery is regarded in the United States as being of such a serious nature that it is made a felony in nearly all of the States, and the punishment for the various species of bribery may be, in New York, and many other States, imprisonment for a period not exceeding 10 years. "Bribery at common law, in a judge in relation to a cause pending before him, was regarded as an offense of so grave a nature that it was sometimes punished as high treason before the 25 Edw. III., and at this day is certainly a very high offense, and punishable not only with forfeiture of the offender's office of justice, but also with fine and imprisonment," etc. Bribery in England is punished in inferior officers with fine and imprisonment, but in judges, especially the superior ones, it has always been looked upon as a heinous offense. In the United States in many jurisdictions bribery at elections, either effected or attempted, is a disqualification for office, and an election procured by bribery is void. An attempt to bribe, though unsuccessful, has been held to be criminal, and is punished in many States as severely as the substantive offense. The reason for the law is plain. The offer is a great temptation to the weak or the depraved. It tends to corrupt, and as the law abhors the least tendency to corruption, it punishes the act which is calculated to debase, and which may affect, viciously, the morals of the community.

Brice, Arthur John Montefiore, English barrister and traveler: b. 27 June 1859. He founded and for some time edited the 'Educational Review,' and has traveled extensively in Europe, Asia, the Arctic regions, and North and South America. He has published 'Stanley, the African Explorer' (1888); 'Florida and the English' (1888); 'David Livingstone' (1889); 'Leaders into Unknown Lands' (1891); 'Geographical Methods' (1895); 'The Great Frozen Land' (edited 1895).

Brice, Calvin Stewart, American capitalist: b. Denmark, Ohio, 17 Sept. 1845; d. New York, 15 Dec. 1898. He practised law in Cincinnati from 1866 to 1880, when he became interested in railroad and various other financial undertakings. He was presidential elector on the Tilden ticket in 1876 and the Cleveland ticket in 1884 and chairman of the Democratic National Committee in 1888. In 1890 he was elected United States Senator from Ohio, and served on the Appropriations, Pensions, Pacific Railroad, and Public Buildings and Grounds committees. Shortly before his death he formed a syndicate which secured vast railroad and mining concessions in China.

Brice, Saint, French prelate: b. Tours; d. there, 13 Nov. 444. He is commemorated on 13 November. On the death of Saint Martin he was made Bishop of Tours. St. Brice's Day, 1002, is memorable in old English history for a great massacre of the Danes. It was believed that it was a concerted attempt to exterminate all the Danes in England; but, failing of its bloody purpose, it led to reprisals by the Danish King Sweyn.

Brick, Jefferson, a figure in Dickens' 'Martin Chuzzlewit,' intended as a caricature of an American journalist of 60 years ago.

Brick, a rectangular mass of clay, dried in the sun or baked in a kiln, and used for building purposes. To mold wet clay into cubes for the erection of walls and houses was one of the first efforts of man at architecture. There still exist in perfect preservation sun-dried bricks made by the Babylonians and Egyptians over 4,000 years ago. On some of these are valuable inscriptions relating to the cause of their making, family history, etc. In many cases straw was mingled with the clay in order to give it greater coherence. The story of the Egyptian taskmasters and the brick-making Israelites told in Exodus i. 14; v. 4-19, is too well known for further reference here. Scarcely less ancient than these Babylonian and Egyptian bricks are the "adobe" bricks of Yucatan and Mexico. There still exist in Colorado, Arizona, New Mexico, Texas, and California hundreds of these 'dobe houses, some of them more than 300 years old and still inhabited. The Aztecs and other American aborigines were adepts at using this material, and constructed wonderful architecture out of it. The present Indian town of Laguna, in New Mexico, illustrates the decadence of this art, which the Spanish found so perfect in Old Mexico.

The modern methods of building-construction in America, by which towering skeletons of steel are used as a framework, compel the use of vast quantities of brick as "filler." Not even the manufacturers can give an accurate estimate of the number of bricks made in the United States annually, but a conservative figure would be 25,000,000,000. Of this enormous output about \$1,000,000 worth is exported.

Varieties.—There are about 100 different varieties of brick now made in the United States, so marvelously has this industry grown of late. One can now order bricks of almost any conceivable size, shape, or hardness, from the ordinary red brick of our forefathers to the delicate pressed high-art work for the façades of ornate structures. The material varies. Common brick for rough wall work and filling comes from the soft sand clays along the Hudson and in New England, Kansas, and the Far West. Fine face-brick for the fronts of buildings is usually made from the better clays of Staten Island, New Jersey, and Pennsylvania. Powerful machinery now grinds up shale, fire-clay, quartz, spar, calcine, lime, ochre, and like hard materials to form the imperishable fire-brick and vitrified brick. The former is used between the beams and joists of the modern "skyscraper," to make the building impervious to fire, as this brick has been already so heated that further heat, even in a mighty conflagration, affects it little. Vitrified brick is used mostly for street pavements; some cities, like

BRICK

New Haven, Conn., being paved almost entirely with it. This material wears for years, and is probably the most economical paving known. Terra-cotta tiling and pipe for drains are also included as part of their output by many brick manufacturers, as well as the beautiful colored and glazed bricks used for mantels and ornamental work. Probably 80 per cent of all the brick made is the rough and semi-rough for wall work. Some of the largest American cities have stringent fire laws which compel all buildings in the corporate limits to be built of brick, stone, or iron. Denver, Col., is in this class, 97 per cent of its houses being of brick, no wooden house existing there.

Manufacture.—Scattered over almost every part of the United States and Canada are brick-yards. There are about 12,000 manufacturers of brick in the United States, 8,000 of whom are large concerns using more or less machinery. Some of these latter have yards in which 10 machines are working, each machine capable of turning out 100,000 finished bricks per day. This means 1,000,000 bricks a day for one yard. As the average period of work per year is eight months, such a yard can (and usually does) produce 200,000,000 bricks each season. Scarcely any of the larger firms but has at least one of these machines. One enormous plant just established at Dover Point, Mass., covers a vast area, and has huge traveling cranes which move 20-ton loads of brick with gentleness and precision. Electric lights and power thus enable a few men to do the work of a hundred by the old methods.

Brick-clay consists largely of hydrated silicate of alumina, with iron in varying quantities, and sand, or free silica. It varies greatly in adhesiveness, hardness, and value. The hand method of working the clay into brick is still used by about 4,000 small yards in the United States. By it one or two men can mold and kiln about 50,000 rough bricks in a season, though under favorable conditions they may make considerably more. The clay is usually dug in the autumn and allowed to freeze and thaw until spring, thus disintegrating the mass thoroughly through the action of frost. It is then either spaded until all lumps are removed, or put into a horse-power pug-mill, where it is ground up more thoroughly. The mold is simply a box, open at both ends, the size of the brick desired. The protruding clay is planed off with a straight-edge, and the cube of wet clay is then allowed to dry in sheds for some hours before it is placed in a kiln for firing. This latter process usually takes from 10 to 15 days, and must be carefully attended to, so that the brick shall not become cooled until the operation is finished. After cooling, stacking, and counting, they are ready for the market.

Of the 8,000 concerns in the United States who may properly be termed manufacturers, about 50 per cent use what is known as the "stiff plastic" process of making brick, which is now recognized as the best and most economical of all. It saves from 20 per cent to 40 per cent in labor and makes a perfectly homogeneous brick. If the material to be worked is of a hard or flinty nature (shale), it is first ground in a "dry-pan," after which it is raised by means of a cup elevator and passed through a screen to the pug-mill, or mixer, the tailings from the screens being returned to the dry-pan. If the material is sufficiently open, as

good brick-clay should be, it can be run direct to the pug-mill with little disintegration or grinding. The pug-mill is usually 10 or 12 feet long and contains a series of mixing knives, by which the clay and water are mixed to a proper consistency. From this mixer the clay passes into the brick machine, where it is compressed by a heavy auger into a solid and continuous column, being forced on to the cutting-table through a die of proper size to form the length and width of the brick. The cutting is done by fine steel piano-wires on a revolving wheel, working automatically. One of these machines is capable of turning out an average of 100,000 bricks per day. A belt traveling a little faster than the column is moving, separates the severed cubes and carries them to the re-press. This latter squares their corners and edges, gives them a smooth, polished surface, and imprints upon them any lettering or design desired. The cubes are not put through the re-press unless intended for front- or face-brick. The common, rough brick go immediately from the cutting-table to the dryer, which consists of a series of tunnels built of brick 4 feet wide and 5 feet high by 120 feet long. These tunnels are heated by a furnace underneath, by steam pipes, or (in large plants) by a blower which conveys the waste heat from the cooling kiln. The cubes are loaded on little cars and run into these tunnels, where they remain till drawn out at the end of 24 hours thoroughly dried. Each tunnel holds about 5,000 bricks. The bricks are then ready for the kilns, which are of various designs. The down-draft is a favorite modern method of construction. This requires small structures, round, 10 or 12 feet high and 30 feet in diameter, held in place by heavy iron bands to prevent warping from the intense heat. The floors are made of perforated blocks. Superheated air from the furnaces is forced from the top down through the brick piled within, through the floor, and either out through a chimney or into other kilns or dryers. The interior of these kilns under fire is a solid sheet of twisting flame and heat, turning the brick a cherry red, if of common clay, and white, if of harder material. This is kept up for from six to ten days, when the fires are drawn and the mass allowed to cool. The continuous kiln of from 16 to 22 chambers has been tried considerably of late, and has produced some exceptionally economical results. This stiff plastic method enables the handling of the clay cubes as they leave the cutter without preliminary drying. This and its simplicity make it very popular, and it is rapidly superseding all other methods. The machine is being made for export to Spain and other countries, and is in use in most of the larger yards in America.

About 40 per cent of the 8,000 manufacturers mentioned above are compelled by the nature of their material to use the "soft-mud process." Clays of a short, sandy nature, or those with a disposition to excessive lamination, are readily treated by this system, and beautiful sand-faced brick results. As a rule the Hudson River yards have to use this system, as well as many in New England and the Middle West. The clay passes first through the separator to free it of lumps, whence it is elevated to the pug-mill compartment of the brick machine. In the pug-chamber it is thoroughly mixed, and water added to make it of the proper consistency to

BRICK-LAYING — BRIDE AND BRIDEGROOM

mold easily. The machine presses it into wooden molds, which are sanded inside to prevent adhesion of the clay to the mold, and are removed automatically. They are then placed on a revolving dumping-table, where they are dumped on to pallets, the empty mold being again sanded and passed to the machine for use again. Then the brick goes to the dryer and afterward to the kiln. It takes much longer to make brick by this mold method, but a very fine brick is produced, with a perfectly homogeneous body to it.

Not more than 10 per cent of the manufacturers can or do use the expensive "dry press" method, which takes the finer clays and presses them with a force of 20,000 pounds to the square inch into steel molds. The clay is nearly dry when this is done, so that the cakes can be handled with ease at once. The objection urged by some against this method is that the brick resulting is too porous and apt to absorb moisture, and "sweat" or disintegrate. Still, for the finer clays this method possesses advantages which will cause it to be used for a long time, and it may never be abandoned. The beautiful clays of Staten Island and in portions of New Jersey and Pennsylvania are nearly white, very fine, and smooth in texture. These work up into most artistic front- or face-brick for the exterior of fine buildings, or for decorative mantel and chimney work in the interiors. It is the most costly brick known to the trade. The machinery used in this process is simple, consisting of presses, dies, and molds. It naturally requires less time to dry and kiln these bricks, but the process is not a rapid one.

Fire-brick, paving-brick, fire-proof lathing, and other forms of excessively hard brick are made from shale, quartz, and difficult material generally. This has to be ground up by ponderous dry-pans before it can be cast into shape. The mold system is of necessity most used in making this class of goods, though some excellent work is turned out by the stiff plastic method above described. The lathing contains a proportion of sawdust to enable nails to be driven into it. In this category should come the terra-cotta brick for roofing, etc. Enormous quantities of fire-proof brick are now being made for the huge new buildings of our modern cities. Its manufacture is a distinct trade in itself. Modern American-made brick, of whatever design or quality, is 10 times harder and more durable than that of most other countries, though produced at a fraction of the cost. But for the great weight of brick our exports would be enormous. Each year American ingenuity perfects additional machinery enabling better and cheaper brick to be made. The brick of to-day will outwear five of those made even 10 years ago, as a rule.

For further information regarding the uses of brick, see DRAINS; SEWERS; STREET PAVING; etc.

PUTNAM DREW.

Brick-laying and Brick-work. See MASONRY AND BUILDING.

Bricks Without Straw, a novel by Albion W. Tourgée, containing a modern application of the Biblical phrase. The words are an allusion to the darkest days of the Hebrew bondage in Egypt, when the toilers were ordered to furnish their own straw without diminishing the number of bricks produced in a given time.

Bridal Wreath. See SPIRÆA.

Bride, Saint. See BRIDGET.

Bride and Bridegroom, words of Anglo-Saxon origin applied from very early times to a newly married wife and husband, the more common form at present being bride and groom. It has been usual from the earliest period of antiquity to pay especial honors to a bride and groom, and in every age and among every people, the wedding-day has been devoted to joyous and solemn ceremonies. It was celebrated among the Athenians by offerings made in the morning to particular divinities, to Zeus and Hera, and especially to Artemis, who was thought to look with disfavor upon marriages. The bride consecrated locks of her hair to the Fates, and both the bride and bridegroom bathed in water brought from some favorite fountain. At nightfall she was conducted to the bridegroom's house, in a chariot drawn by a pair of mules, and furnished with a kind of couch, on which she sat between her husband and one of his nearest friends. She was veiled, and all were in their best attire, with chaplets about their heads. The bridal procession moved on, greeted and accompanied by friends bearing nuptial torches and singing hymeneal songs to the accompaniment of Lydian lutes. As the bride alighted, the axle of the carriage was in some parts of Greece burned to signify that she was from that time to remain at home; and as she entered through the door, hung with festoons of ivy and bay, sweetmeats were showered upon her as emblems of plenty. Then followed the marriage feast, to which, contrary to the usual Greek practice, women as well as men were invited; and at its close the bride was conducted by the bridegroom to her apartment, where a law of Solon required that they should eat a quince together. Before the door the epithalamium, or bridal song, was sung. On the day after the marriage, presents were made to the newly married couple by their friends. A relic of barbarism in the Spartan customs was the pretended seizure of the bride by the bridegroom, after the preliminaries of marriage had been arranged with her parents or guardians. Among the Romans the same custom prevailed, in memory of the rape of the Sabines. The wedding day was fixed, at least in early times, by consulting the auspices, and the bride was attired in bright yellow shoes, and a veil of the same color, and in a long white robe, adorned with a purple fringe and with ribbons, and bound about the waist by a girdle or zone, to be unloosed by the bridegroom. The Roman marriage was usually, though not always, untended by religious rites. The bride was conducted to the house of the bridegroom by a procession resembling that in the Greek ceremony, and bore in her own hands the emblems of diligence, a distaff and a spindle with wool. She wound wool around the doorposts of her new residence, which were also adorned with garlands and flowers, and was lifted across the threshold by two married men, since for her to have touched it with her foot would have been an evil omen. The bridegroom received her within with fire and water, a symbol, perhaps, of purification. She received the keys of the house while sitting upon a sheepskin, and the ceremonies of the day were concluded by a repast given to friends and relatives. The bridal

BRIDE OF ABYDOS—BRIDGE

apartment, to which she was conducted by matrons who had not had more than one husband, was magnificently decked with flowers, and minstrels and friends sang without during the night.

In the days of our ancestors various ceremonies, often "more honored in the breach than the observance," were followed. The bride was undressed and put to bed by the bridesmaids, and the bridegroom submitted to the same operation, at the hands of the groomsmen. Then the posset, a drink made of milk, wine, yolks of eggs, sugar, cinnamon, and nutmeg, had to be served. Then there was sometimes another dila-tory proceeding in the sewing of the bride in a sheet. The arraying of the bride in white, the wedding feast, and the giving of presents are ancient customs. As early as the time of James I., the presents received by the bride of Sir Philip Herbert amounted in value to \$12,500, a notable expenditure of the kind for those days, but frequently surpassed at the present time by the value of a single bridal gift. The bridal kiss is of unknown antiquity. The old missals, which date long before the "common prayer book," enjoined it as an essential part of the marriage ceremony. Moreover, it was always done in church. The priest, too, at one time, enjoyed the privilege of kissing the bride. Groomsmen claimed and took it for a long period. The ordinary accessories of the weddings of our days may mostly be traced to ancient times. The marriage ring probably encircled the finger of the wife of the first Pharaoh, and was certainly used in the Roman ceremonies under the emperors. Its heathen origin nearly led to its abolition by the Puritans of Cromwell's time. The wedding ring is always put and worn on the fourth finger of the left hand, because it was supposed in ancient times that an artery ran from this part directly to the heart. The bride-cake is no less sanctified by antiquity than the ring. It is a symbol of plenty, and is intended to express the hope that the newly married pair may be always supplied with an abundance of the good things of this life. In ancient days wheat was sprinkled upon the head of the bride with the same intent. At present this custom is superseded by the scattering of rice upon the bride and groom as they leave the house after the reception. The throwing of an old shoe after the couple shows traces of an old superstition. Passing bits of the cake through the wedding ring nine times, and putting them under the pillow to dream upon, was a practice in vogue long before our great-grandmothers lived and loved. Putting up the slices in white paper boxes is an innovation of later times. Wine was an invariable accompaniment of all marriages, long before the marriage feast at Cana. In times past it was customary to drink it in the church, the priest having first blessed the cup, however, to suit it to the holiness of the place. The Jews universally hold to the custom of wine-drinking on the occasion of a marriage. After the bride and groom have drunk from the glass it is broken to remind them of mortality.

Modern custom lengthens out the privileges of bride and bridegroom beyond the wedding day. In former times, when the religious ceremony and the attendant festivities were over, all bridal honors ceased. These are now prolonged by the bridal tour. The term honeymoon, formerly applied to the first month of married life, is now more vaguely used and is sometimes

given to the entire period of the bridal tour, even when that is extended over many weeks.

Bride of Abydos, The, a poem by Lord Byron, published in 1813. From this a melo-drama was adapted a few years later by Dimond.

Bride of Lammermoor, The, by Sir Walter Scott, one of the group of 'Waverley Novels' called 'Tales of my Landlord.' The scene is laid on the east coast of Scotland, in the year 1700. The hero is Edgar, Master of Ravenswood, a young man of noble family, penniless and proud. He has vowed vengeance against the present owner of the Ravenswood estates, Sir William Ashton, lord keeper, whom he considers guilty of fraud; but foregoes his plans on falling in love with Lucy, Sir William's daughter. There is a secret betrothal; the ambitious Lady Ashton endeavors to force her daughter to marry another suitor; and in the struggle Lucy goes mad, and Ravenswood, thinking himself rejected, comes to an untimely end. The most famous character in the book is the amusing Caleb Balderstone, the devoted old steward of Ravenswood, who endeavors constantly to save the family honor and to conceal his master's poverty by ingenious devices and lies, and whose name has become the symbol of "the constant service of the antique world." Though sombre and depressing, the 'Bride of Lammermoor' is very popular, and the plot has been used by Donizetti in the opera 'Lucia di Lammermoor.'

Bride of Messina, The, a tragedy by Schiller, based on Sophocles' 'Œdipus Tyrannus.' It was brought out in 1803.

Bride of the Sea, a poetical name given to the city of Venice in allusion to the custom of wedding the Adriatic Sea with a ring. This picturesque ceremony was annually observed by the doges.

Bride'well, formerly a famous house of correction in Blackfriars, London. The name originally belonged to a well dedicated to St. Bride. Henry VIII. built on this site, in 1522, a palace for the accommodation of the Emperor Charles V., which became a residence of Wolsey, and under Edward VI. was, in 1553, converted into a workhouse for the poor, and a house of correction for the idle and vicious. Prisoners here were made to work during their confinement, as in most other houses of correction. From this, as one of the earliest houses of correction, there originated the generic term, "a bridewell"—a house of correction. It was governed by a keeper who was independent of the sheriff of London.

Bridge, Horatio, American naval officer: b. Augusta, Me., 8 April 1806; d. Athens, Pa., 18 March 1893. He graduated at Bowdoin College in the famous class of 1825, which included Longfellow, Hawthorne, J. S. C. Abbott, and G. B. Cheever. He was admitted to the bar in 1828, and for 10 years was in practice at Skowhegan and Augusta, Me. In 1838 he entered the United States navy as paymaster; made a cruise in the Cyane (1838-41); in the Saratoga upon the coast of Africa (1843-4), some account of which was published in 1845 under the title 'Journal of an African Cruiser,' edited by his friend, Haw-

BRIDGE

thorne. In 1854 he was appointed chief of the bureau of provisions and clothing, the duties of which he performed for nearly 15 years, including the whole period of the war. In 1873 he was retired as pay-director with the relative rank of commodore. He wrote some valuable reminiscences, entitled 'Personal Recollections of Nathaniel Hawthorne' (1893).

Bridge, Sir John Frederick, English organist and composer: b. Oldbury, Worcestershire, 5 Dec. 1844. He was organist of Trinity Church, Windsor, Manchester Cathedral, and in 1875 became full organist of Westminster Abbey. He was also made professor of harmony at Owens College, Manchester, and afterward professor of harmony and counterpoint at the Royal College of Music. Among his works are the oratorio, 'Mount Moriah'; the cantata, 'Boadicea'; the cantata, 'Callirhoe'; the oratorio, 'The Repentance of Nineveh'; etc. He has set many hymns to music, notably Gladstone's Latin version of 'Rock of Ages.'

Bridge, Joseph Cox, English musician: b. Rochester, England (brother J. F. Bridge, q.v.), 16 Aug. 1853. He studied under his brother and John Hopkins. From 1871-6 he was organist of Exeter College, Oxford, and in 1879 became organist of the Cathedral of Chester. The music-festival of that city owes its revival to him. Most of his works are for church use. Among them are: a Magnificat, a Nunc Dimittis, and the oratorio 'Daniel.'

Bridge, a game of cards. In Turkey and Egypt it has been known for some time, but is played much more scientifically in England and the United States, where it was introduced in the last decade but one of the 19th century. It is played with one pack of cards, and the four players are styled the dealer, the leader, the dummy, and the pone. Bridge is allied to whist, and like that game is played in more than one way. See De La Rue, 'The Laws of Bridge' (1889); Foster, 'Bridge' (1901); Dunn, 'Bridge, and How to Play It' (1901); Steele, 'Simple Rules for Bridge' (1902).

Bridge, a structure supporting a roadway, designed to afford communication between the banks of a river or ravine, or to cross any open space. Bridges were formerly made of wood, brick, stone, or iron, but steel is now rapidly displacing these materials, except for the construction of bridges of minor importance.

History of Bridges.—Stepping-stones in shallow rivers, connected by planks, exhibit the incipient principles of piers and arches which science has brought to their present perfection. In deeper rivers an accumulation of stones would form a loftier pier; and where the openings were sufficiently narrow, and the slabs of stone sufficiently long, or the art and strength of the untaught architect sufficient to the task, a stone roadway was formed from pier to pier.

Among most of the nations of antiquity the arch appears to have been unknown; its first use in bridge-building being attributed to the Chinese. The word bridge does not appear in the Authorized Version of the Bible. Military bridges, often of boats, were constructed before permanent structures for the convenience of the inhabitants were erected. Thus, Cyrus con-

structed such bridges about 536 B.C., Darius Hystaspes about 490, and Xerxes about 480 B.C. Bridges of stone or brick seem to have been first used by the Romans; there were none erected in Greece till after the Roman conquest. No people of the ancient world carried the power of rearing the stupendous arch and the magnificent dome to such an extent as the Romans, who are supposed, however, to have derived their first knowledge of the art from the Etruscans, and in the construction of stone bridges the highest rank must be conceded to this indefatigable people. The bridges of ancient Rome were eight in number. The first is said to have been one spanning the Tiber between the Janiculum and the Aventine Mountain, built by or under Ancus Martius, and famous for its defense by Horatius Cocles. One or two of these bridges are still standing; that called Ponte Fabricio having been built 62 B.C. One of the finest Roman examples was the bridge built by Augustus over the Narni, the vestiges of which still remain. It consisted of four arches, the longest of 142 feet span and over 100 feet high. A still more remarkable bridge, built by Trajan over the Danube, 115 A.D., and 4,770 feet long, was destroyed by his successor Hadrian. The most celebrated bridges of the Romans were not generally, however, distinguished by the extraordinary size of their arches or the peculiar lightness of their piers, but by their excellence and durability. The span or chord of their arches seldom exceeded 70 or 80 feet, and the versed sine or height was nearly half of the chord, so that they were mostly semicircular, or constituted a segment nearly of that form.

Among the most celebrated bridges built subsequently to the destruction of the Roman empire are those of the Moors in Spain, who imitated and rivaled the best constructions of the Romans. The bridge of Cordova, over the Guadalquivir, is an eminent example of their success. The bridge over the Rhone at Avignon, begun in 1176, and now represented by a picturesque fragment, is one of the most ancient bridges of modern Europe. It was built by a society or order called the Frères Pontiers, or "Brethren of the Bridge." It was composed of 19 arches. The length of the chord of the largest was 110 feet 9 inches, and its height 45 feet 10 inches. Of the nations of modern Europe the French were among the first to carry the art of bridge-making to its present perfection. The constructions of Perronet, who was chief engineer of bridges and highways in France under Louis XV. and Louis XVI., have never been surpassed. Among them were the bridges of Nogent-sur-Seine (1766-9); Neuilly (1768-74); Louis XVI., at Paris (1787-92). The bridge at Neuilly consists of five arches, each 128 feet span and 32 feet rise.

In Great Britain the art of building bridges appears to have been introduced by the Romans. For special mention of celebrated stone bridges in the United Kingdom, see *Stone Bridges*, below.

Timber Bridges.—The oldest bridges on record were built of wood. The Sublician Bridge at Rome, referred to above as built by Ancus Martius, was built of timber about 621 B.C. Its destruction took place about 500 B.C.; but a Sublician Bridge was in existence many centuries after this. Another celebrated wooden

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bridge was that thrown by Julius Cæsar across the Rhine, as described in his Commentaries. Germany was the school for wooden bridges, as Britain for those of iron. Perhaps the most celebrated of all wooden bridges was that which spanned the Rhine at Schaffhausen in Switzerland. This had a span of 364 feet, and was 18 feet broad. It was designed and executed by J. Ulric Grubenman, a village carpenter of Teuffen, in 1758, and was destroyed by the French in 1799.

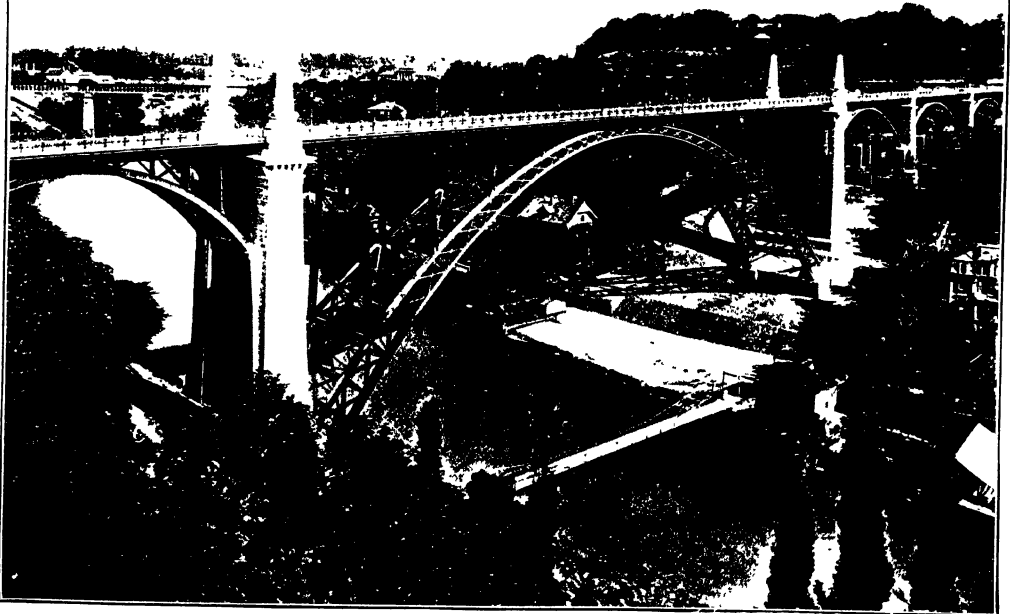
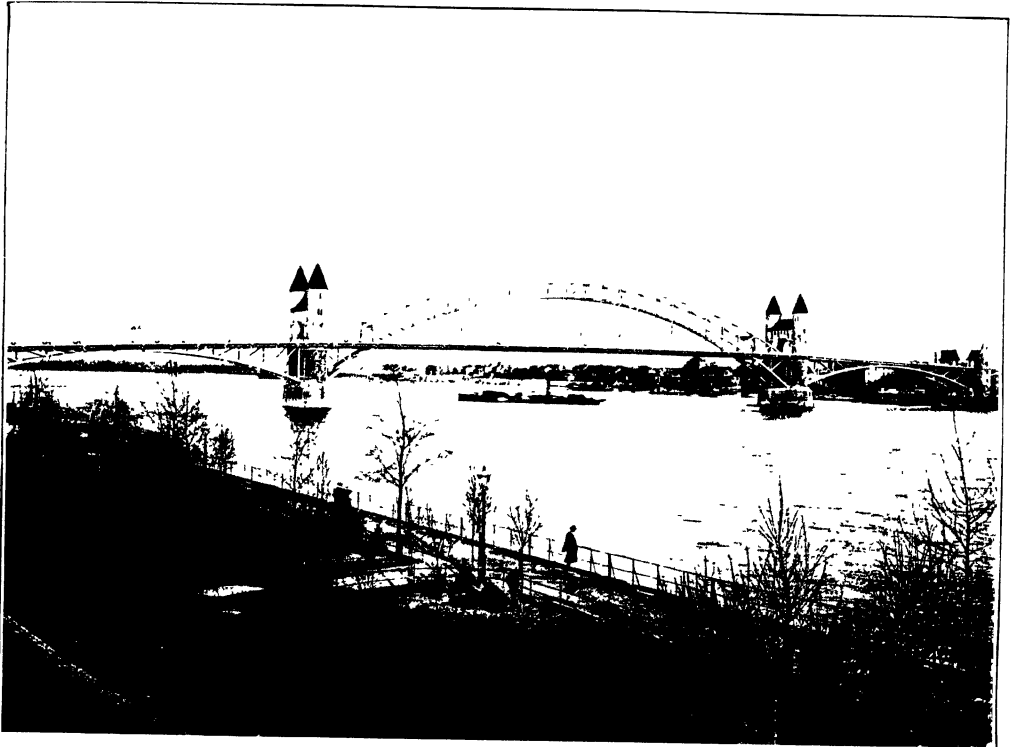
Bridges of timber were formerly much used in the United States and Canada; and many magnificent and elaborately planned structures carried American railroads across rivers and ravines, often at enormous heights. But with the exception of some insignificant spans, steel, as before mentioned, has almost ousted wood.

Stone Bridges.—The theory of stone bridges involves mathematical demonstrations and calculations of the greatest complexity; the properties of the arch, the thickness of the piers, and the force of the water form separate elements in the computations. The arch is a series of wedge-formed bodies cemented together and rendered coherent by mutual pressure, the first and last being sustained by a support or abutment. The centre arch-stone or *vousoir* (a French term) is the highest part or crown of the arch, and is called the "key-stone." The interior surface of the arch is called the "intrados," the part immediately under the keystone is called the "soffit," the remaining portions the "flanks." The term soffit, however, is sometimes used synonymously with intrados. The exterior surface is called the "extrados," or "back of the arch." The points of junction between the flanks and the abutments are called the "springings"; the distance between them horizontally is the "span"; the perpendicular from the soffit to a straight line drawn between them is called the "rise," or height of the arch. The extreme supports of the arches at the ends are called "abutments"; the solid parts between the arches, piers, and the fences on the sides of the road or pathway, "parapets." It has been found that in the construction of an arch the slipping of the stones upon one another is prevented by their mutual pressure and the friction of their surfaces; the use of cement is thus subordinate to the principle of construction in contributing to the strength and maintenance of the fabric. The line of resistance of the materials forming any structure, whether straight or curved, being capable of geometrical calculation, it can be determined beforehand whether this line will fall within or intersect each successive joint of the structure; if it does, the mass will not be liable to turn over on the edge of any particular joint. By a more exact calculation of the line of resistance, even the slipping of one joint upon another can be obviated by the form of the structure. This is called determining the line of pressure. Upon these two lines the equilibrium of the structure depends. The lines of pressure and resistance in the arch of a bridge are calculated so as to pass into the abutments or piers, where they take a new direction; the strength of the abutments or piers, and the amount and direction of the strain upon them, being calculated by the architect so as to render them capable of permanently supporting the fabric. When the pressure upon an arch causes it to give way, it

breaks into four parts, the stones turning inward upon their superior edge at the crown, and outward on their inferior edge at two points in the haunches where the line of resistance reaches the interior edge, and which are called the points of rupture. The ancients, being unacquainted with the full theory of the arch, usually made their arches more numerous, of smaller span, and with stronger piers than are found necessary in modern structures. Another advantage which the modern architect of bridges has over the ancient is in the invention of the cofferdam (q.v.). This is a water-tight case made to protect the middle piers of a bridge, by driving piles down to the solid foundation, and filling them up with clay or other impermeable material, so as effectually to exclude the water. In constructing a bridge it is desirable to have the smallest possible number of points of support. Piers in the water-way are not only expensive to form, but obstruct the navigation of the river. When the water-way is obstructed the bridge itself is exposed to danger, the wearing action of the water sometimes undermining the piers on which it rests. The pier, at the point where it supports the arch, is usually oblong in form, and increases in breadth to the foundation. The rate of increase in modern bridges is frequently three inches to the foot. The ends of piers are provided with salient angles to act as cut-waters; the form of these differs according to circumstances. In building the arch of a bridge, a timber framework is used called a "centre," or "centring." The centring keeps the voussoirs in position till they are keyed in; that is, fixed by the completion of the central part; its construction is a matter demanding the utmost care of the architect. On removing this framework, which is called "striking the centre," what is called the settlement of the arch takes place, the central voussoirs move slightly downward, while a corresponding rise takes place in the flanks. Before striking the centre of the bridge of Nogent-sur-Seine, Perronet caused three lines to be cut, one horizontally over the crown, and two obliquely from the extremities of this line to the springings. On the striking of the centre these lines were found to have altered their forms and relative positions. From straight lines they had become curves. The horizontal line had sunk, and its greatest deflection was above the key, while the oblique lines from the springings were deflected upward. The "spandrels" of a bridge are the spaces between the haunches of the arch and the point of junction of the extrados with the roadway. These are frequently filled up with rubble-work or gravel. They are sometimes left open to give greater lightness to the structure. The former plan has been generally adopted in the large French bridges; the latter was recommended by Telford. Owing to the superior skill of modern engineering, the roadways of bridges are made much wider and more level than formerly.

The most ancient stone bridge in England is said to be the Gothic three-way bridge at Croyland, or Crowland, in Lincolnshire, said to have been built in 860, though the present work is much later. It originally spanned three water-courses, and is so steep that none but foot-passengers can go over it. The longest old bridge in England was that over the Trent at Burton, in Staffordshire, built in the 12th century, of squared freestone. It consisted

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BRIDGE OVER THE RHINE AT BONN, PRUSSIA (Upper)
BRIDGE OVER THE AARE AT BERN, SWITZERLAND (Lower)

BRIDGES.

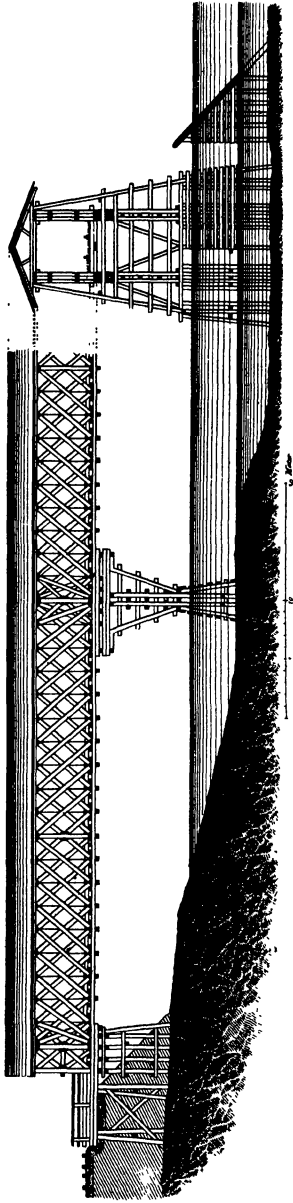


Fig 1

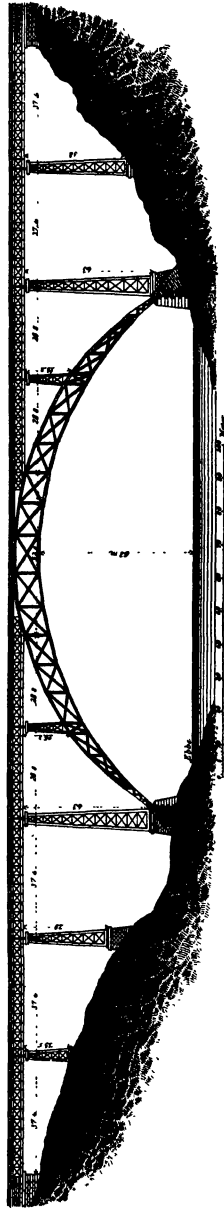


Fig 2

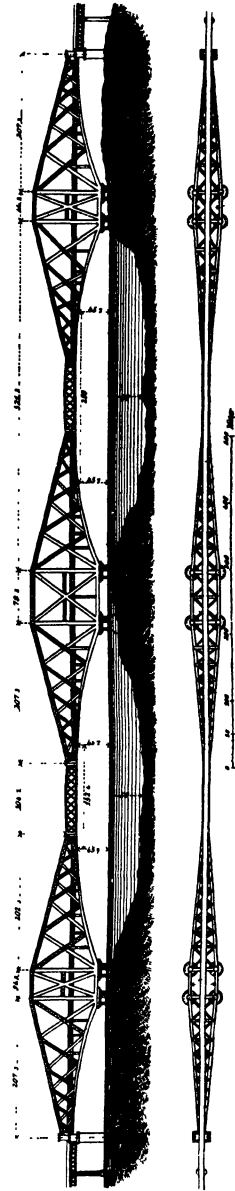


Fig 3

- 1 Roofed woden-truss or lattice bridge
- 2 Railway bridge over the Douro at Oporto, Portugal.

BRIDGE

of 36 arches, and was 1,545 feet long. It has recently been pulled down. Old London Bridge was commenced in 1176 and finished in 1209. It was built on each side with houses like a regular street till 1756-8. In 1831 it was altogether removed, the present bridge, which had been begun in 1824, having then been finished. It consists of five elliptical arches, of which the centre arch has 152 feet span with a rise of 29½ feet above high-water mark. The two arches next the centre are 140 feet span with 27½ feet rise. The total length of the bridge is 1,005 feet, and the roadway is 53 feet wide between the parapets. It was erected, after designs of the elder John Rennie, by his son, Sir John Rennie, and cost about \$2,500,000. Waterloo Bridge, London, is generally considered one of the finest and handsomest stone bridges yet built. The architect was the elder John Rennie, and the bridge was completed in 1817. The material is Aberdeen granite, and it consists of nine elliptical arches of 120 feet span with a rise of 32 feet, the total length, including the approaches, being 2,456 feet. The width between the parapets is 41½ feet. The roadway is almost perfectly horizontal, and the bridge was one of the first in which this construction was adopted. Other English bridges of importance are the Grosvenor Bridge at Chester (1826), consisting of one arch 200 feet in span, one of the largest stone archways yet constructed; the Royal Border Bridge (railway), Berwick, 2,160 feet long, with 28 arches, designed by Robert Stephenson; the Congleton Viaduct on the railway from Manchester to Birmingham, 2,870 feet long, with 41 arches; the Tyne Viaduct, 902 feet, with four arches, etc.

There are very few bridges of notable antiquity in Scotland. One of the oldest is the bridge over the Don, near Aberdeen, called the Brig of Balgownie, said to have been built by Bishop Cheyne in 1281. It consists of one large Gothic arch of 67 feet span. The bridge at Perth is a handsome structure, designed by Smeaton, finished in 1772, and replacing an old bridge swept off by an overflow of the river more than a century before. The bridge of Tongueland, near Kirkcudbright, over the Dee, consists of one arch of 112 feet span. Union Bridge, Aberdeen, built in 1800-3 from Telford's designs, has an arch of 132 feet span with 29 feet of rise. Dunkeld Bridge, a noble structure built in 1805-9, from designs by Telford, has five large arches and two smaller, the middle arch being 90 feet span. The Dean Bridge, Edinburgh, is a beautiful structure of 1,832 feet (by Telford), remarkable for its situation and height. It crosses the deep ravine formed by the stream called the Water of Leith, a little above St. Bernard's Well. It is 447 feet long, 39 feet wide, and 106 feet from the roadway to the bed of the river. At Glasgow there are two stone bridges of modern construction and remarkable solidity and beauty, spanning the Clyde and connecting the southern with the northern division of that city. One of these was finished in 1854; the other, designed by Telford, called the Broomielaw Bridge, was erected in 1833-6, but has recently been taken down and rebuilt, being now widened from 60 feet to 80 feet. The arches (as before) are segments of circles, seven in number, the span of the centre arch being 57 feet 9 inches, and the length of the bridge about 560 feet. The Ballochmyle Via-

duct, by means of which the Glasgow and Southwestern R.R. crosses the river Ayr, has a central semicircular arch of 180 feet span, the largest span of any railway stone bridge.

Comparatively few large stone bridges are found in America; but a bridge constructed in 1861, to carry the Washington aqueduct over Cabin John Creek, has a stone arch of 220 feet span. The High Bridge, New York, was built to carry the Croton aqueduct across the Harlem River. It consists of 13 granite arches, the highest one being 116 feet above the river. The bridge, crossing the river and valley, is 1,460 feet long. The Washington Bridge, a composite structure, is situated a short distance north of the High Bridge and consists of nine arches, three of granite on the east side, four of granite on the west, and two central steel spans connecting them and crossing the water-way. The entire length of the bridge is 2,300 feet, and its width 80 feet; the central spans being each 510 feet long and 135 feet above high water. The largest single stone span is in Luxemburg, being 277 feet long.

Iron Bridges.—The use of iron in the formation of bridges is a comparatively modern invention, by which greater strength is secured in proportion to the weight of the material employed. The earliest iron bridges were erected in the form of arches, and the material was cast-iron, but the arch has now been generally superseded by the beam or girder, with its numerous modifications; and wrought-iron is likewise found to be much better adapted for resisting a great tensile strain than cast metal. The greater cohesion and adaptability of the material give more liberty to the architect, and both in suspension and in arched bridges of iron much greater width of span is possible than in arched bridges of stone. As already stated, however, steel is now almost exclusively employed in bridge construction (q.v.). The first bridge of cast-iron ever erected was that over the Severn, England, about two miles below Coalbrookdale, Shropshire. It is an arch composed of five ribs, forming the segment of a circle. Its chord is 100 feet long and its height 45 feet. It was erected in 1779. Near it there is a more recent iron bridge of greater span (200 feet), designed by Sir John Fowler for the railway here. The bold and elegant cast-iron bridge over the Wear at Sunderland was opened in 1796, and was widened by Robert Stephenson in 1858-9. It is formed of a single arch of 236 feet span and 34 feet rise, composed of six ribs. The height above low water is about 100 feet. Close to it there is a more recent single-arched iron bridge. Westminster Bridge, over the Thames (opened in 1862), consists of seven low arches of wrought and cast iron, supported on piers of solid granite, and is no less than 85 feet wide. Blackfriars Bridge, London (opened in 1869), consists of five arches of wrought-iron, of which the centre arch is 185 feet span, with its summit 25 feet above high water. The width between the parapets is 75 feet, the roadway in the centre being 45. In front of the piers there are short massive columns of polished red granite, with carved capitals of Portland stone. The Southwark Bridge (opened in 1819), over the Thames at London, designed and constructed by the elder Rennie, consists of three arches, the span of the middle arch being 240 feet and its height 24 feet. One of

BRIDGE

the most celebrated of iron bridges is the High-Level Bridge across the Tyne at Newcastle. It is a double bridge, resting on six massive stone piers which support a carriage road, with foot-paths, and a railway 25 feet above. It was designed by Robert Stephenson and Mr. T. E. Harrison, and was opened in 1849. The loftiest railway bridge in England is the Crumlin Viaduct, in Monmouthshire, constructed in 1853-7. It crosses a mountain gorge at a height of about 210 feet, and consists of 10 spans of 150 feet. The cast-iron piers are strengthened by diagonal braces. Robert Stephenson's Britannia Tubular Bridge, across the Menai Strait, opened in 1850, was one of the greatest triumphs of engineering science in its day. It is situated about a mile from Telford's suspension bridge. The two tubes through which the trains pass are laid side by side, are rectangular, and are constructed of riveted plates of wrought iron. Each tube is divided into four parts, joined end to end at the piers. The bridge consists of four spans, two of 460 feet each, over the water, and two smaller ones of 230 feet each, over the land. The Conway Bridge, over the river Conway, is identical in principle with the Britannia Bridge, but on a smaller scale. The tubular railway bridge across the Damietta branch of the Nile has this peculiarity, that the roadway is carried above instead of through the tubes. The Victoria Bridge over the St. Lawrence at Montreal, completed in 1860 as a tubular bridge, was even more remarkable than the Britannia Bridge, being nearly two miles in length. The upper portion has recently been reconstructed, and the tubes removed in favor of open railway tracks. Wrought-iron girder bridges followed the development of the tubular system, and latterly—especially those on the lattice-girder principle—have become exceedingly common. The girder bridge across the Firth of Tay at Dundee was opened in 1887. It is 2 miles 73 yards long, has 85 spans, is 77 feet high in four of the mid-spans, and carries two lines of rails. It was built to take the place of a similar bridge that had not stood long when a great part of it was blown down in a storm, while a train was crossing, in 1879.

American engineers have been very successful as iron-bridge builders, adopting various forms of girder, and constructing also some splendid bridges with arches of great span built up of wrought-iron and steel. Some important bridges in the eastern hemisphere have been constructed by Americans with materials sent from their own works in America, competing directly and successfully against British bridge-builders on their own territory. Particulars of some of these bridges are given under the title *Bridge-Construction* (q.v.).

The iron lattice bridge, so called from having sides constructed with cross-bars, like lattice-work, is the natural outcome of the tubular bridge for long spans, developing equal strength with considerable economy of material and labor. Lattice girders are now almost universally adopted for iron bridges for long spans.

Cantilever Bridges.—The principle of the cantilever has recently been developed to a considerable extent, especially in the United States, where enormous spans are daily in process of construction. The cantilever is a bracket resting on a pier in the river or ravine to be crossed, and so balanced and secured that the extended

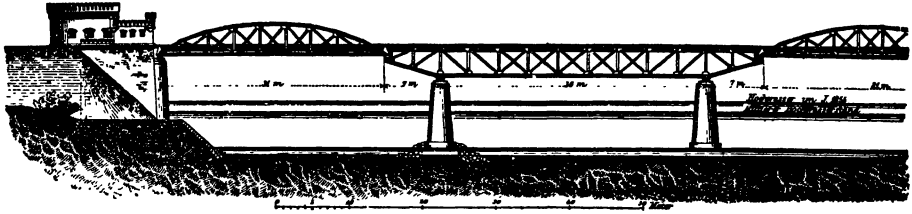
arm will support both its own weight and its movable load. It is connected at its mid-river extremity by a girder span, with a similar bracket reaching from the opposite shore. There are several of these bridges in the United States, the first of any size being the Niagara cantilever, built in 1883. Its total length is 910 feet, and it is 295 feet above the surface of the river, with steel towers 130 feet high. The Hudson River Bridge at Poughkeepsie, built in 1889, has a length of 6,767 feet, and is built in five spans; the first, third, and fifth being true cantilever spans with fixed continuous spans connecting them. The new Blackwell's Island Bridge, New York, is an example of the cantilever principle. There are four channel piers, 85 by 45 feet at the base, and 135 feet above high tide. These piers contain 810,000 cubic feet of granite. The bridge is two miles in length, with two channel spans of 846 feet each, and a span across Blackwell's Island of 613 feet. The distance from the floor of the bridge to the top of the girders forming the span is 100 feet, making the top of the structure 235 feet above high tide. Other notable cantilever bridges are those across the Colorado River at Red Rock, Cal., and across the Mississippi River at Memphis, Tenn.

A fine example of this method of construction is found in the great railway bridge over the Firth of Forth at Queensferry, Scotland, completed in 1889. It has two chief spans of 1,710 feet, two others of 680 feet, 15 of 168 feet, and seven small arches. The total length of the viaduct, including piers, is 8,296 feet, or a little over $1\frac{1}{2}$ miles, of which almost exactly one mile is covered by the great cantilevers. The clear headway under the centre of the bridge is 152 feet at high water, and the highest part of the bridge is 361 feet above the same level. The metal columns above each pier, forming the bases of the cantilever, are 12 feet in diameter. The members under compression are tubular, those in tension are of open braced forms. The wind pressure is assumed from calculation at a maximum of 56 pounds per square foot. The maximum possible stress on any member of the bridge is calculated to be at the rate of $7\frac{1}{2}$ tons per square inch of sectional area, leaving a plentiful margin of strength, since the steel of which the bridge is constructed is capable of resisting a tensile stress of from 30 to 33 tons per square inch, and compression to the extent of from 34 to 37 tons per square inch. Between the two main girders a double line of railway is carried on an internal viaduct supported by trestles and cross girders.

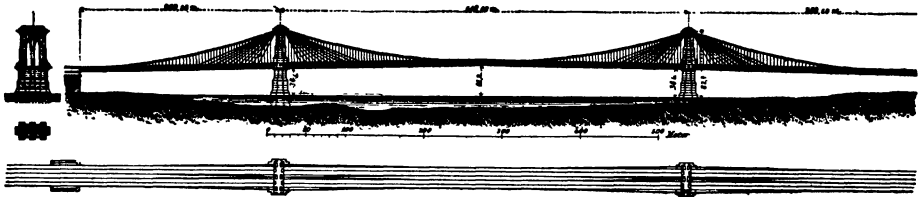
The way consists of heavy bridge rails laid on longitudinal sleepers bedded in four steel troughs, into which the wheels will drop in case of derailment, when they will run on the sleepers. In the piers there are about 120,000 cubic yards of masonry, and in the superstructure 44,500 tons of steel.

Suspension Bridges.—The principle of suspension-bridge construction is very old, and races of limited civilization have used some form of suspension for their bridge-ways. South America and the East Indies are the principal home of these bridges. Ropes of fibre, hide, or tough vines are attached to trees at either side of a river or ravine, and from these a rude platform is suspended. But they are available only for foot passengers, and accidents from failure of the supports are frequent. The use of iron

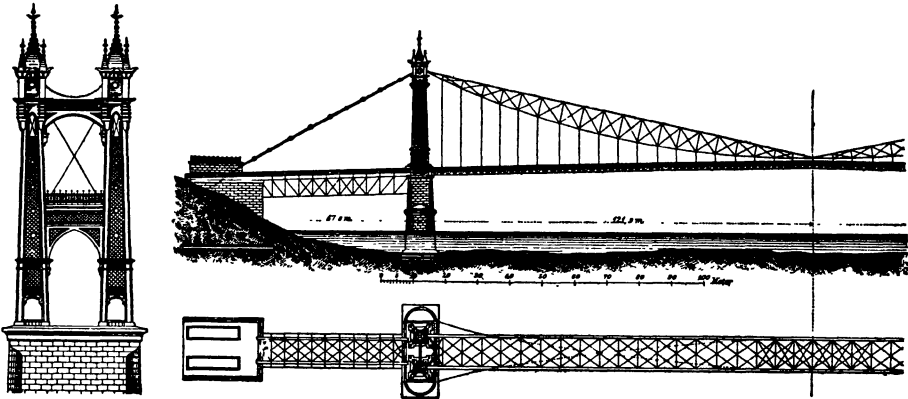
TYPES OF BRIDGES.



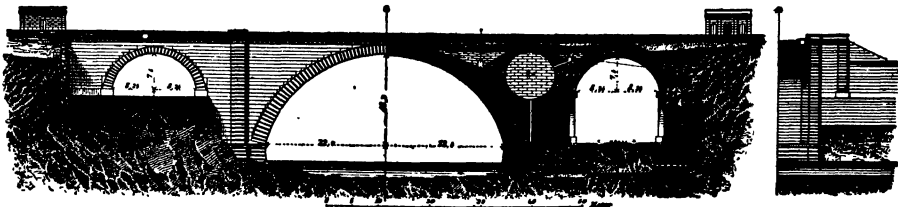
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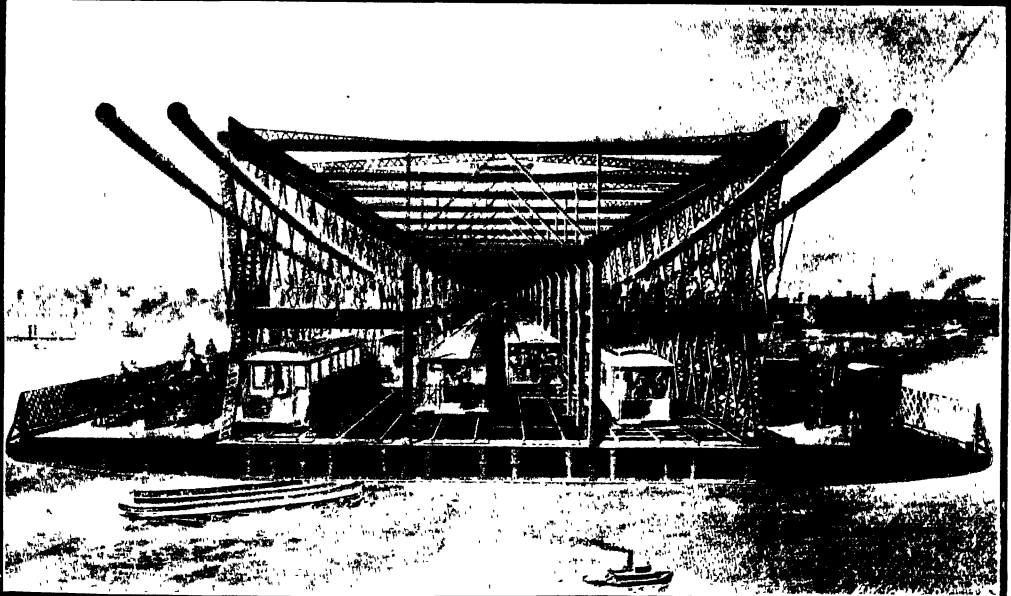
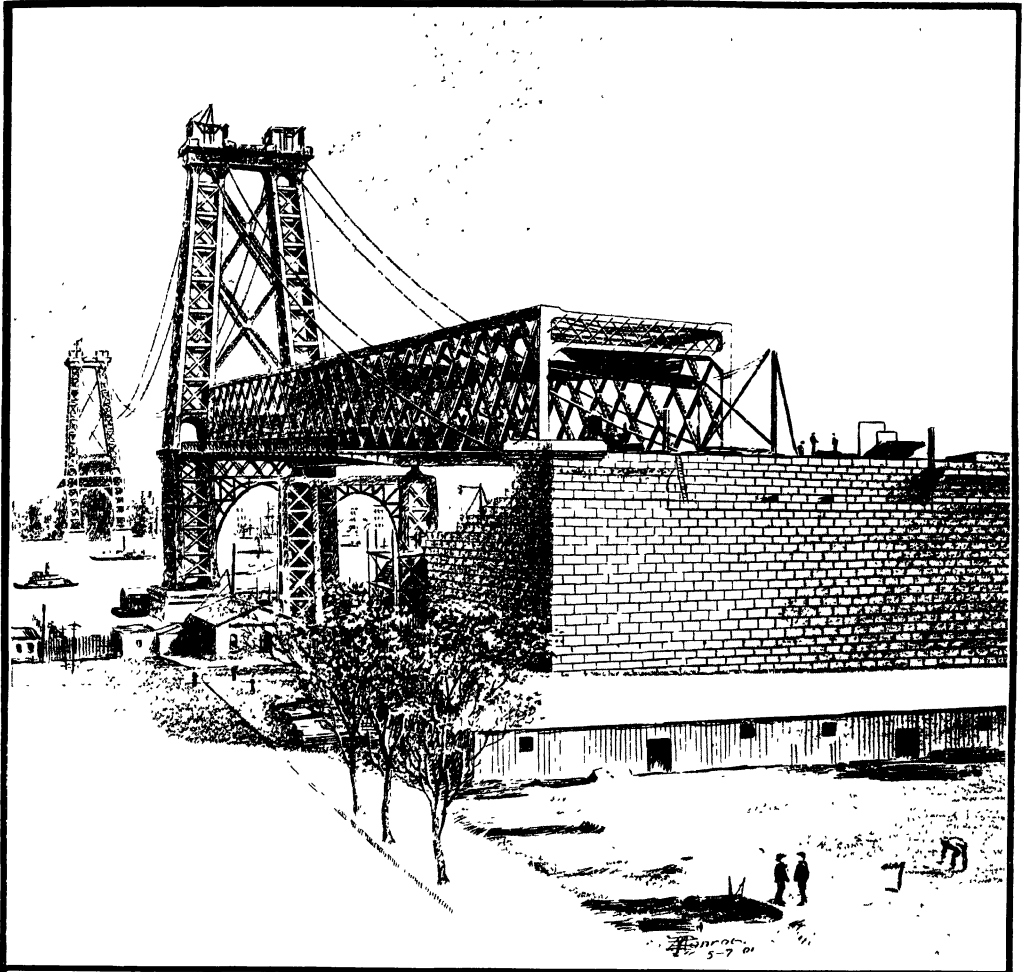


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1. Cantilever Bridge, near Posen.
2. Cable Suspension Bridge, over the East River, New York.
3. Chain Suspension Bridge, over the Monongahela River, at Pittsburg.
4. Stone Arch Bridge, near Berne.



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View of East River Bridge from Brooklyn, Showing Temporary Footway Cables.

Roadway.	Bicycle Track.	Footway.	Elevated Cars.	Footway.	Bicycle Track.	Roadway.
		Surface Cars.		Surface Cars.		

BRIDGE

cables, however, for purposes of suspension, is of comparatively recent origin, and massive stone or steel piers take the places of trees as supports. The earliest chain bridge is said to have been one thrown across the river Tees, England, in 1741. It was about 60 feet wide, and had chains at either end to help to steady it. Various iron suspension bridges were constructed early in the 19th century; but the first really great structure of the kind was the suspension bridge constructed by Telford over the Menai Strait, between the island of Anglesey and Carnarvonshire in Wales. It was finished in 1825. The roadway is 100 feet above the surface of the water at high tide. The opening between the points of suspension is 580 feet. The suspending chains are formed of straight iron bars united by coupling-bolts. The main chains are 16 in number, disposed 4 chains one under the other on each side of the central footpath, and 4 at each side of the platform of the bridge. The ends of the chains are fixed in tunnels in the rock on either side of the strait. On the top of the piers the chains lie loosely upon cast-iron saddles laid upon horizontal rollers that lie in grooves formed in a cast-iron platform on the summit. The saddles can move backward and forward a few inches in the direction of the length of the bridge, and thus expansion and contraction of the chains produce no other effect than to move the saddles as they lengthen or shorten, raising or depressing the roadway a little without producing an injurious strain on the materials. The chains were formed link by link, working from the fastenings in the tunnels at the extreme ends. There are many other suspension bridges in Great Britain. The Union Suspension Bridge near Berwick is 449 feet long. The suspension bridge over the Avon at Clifton is 702 feet long, and 245 feet above high-water mark. The Freiburgt Suspension Bridge in Switzerland is 880 feet long; that over the Danube at Budapest is 666 feet.

In the United States such bridges are also common. The railway suspension bridge over the Niagara, supported by wire cables, is 822 feet long; the platform, which carries three lines of rails, being 245 feet above the river. Another bridge, seven miles below the falls, has a span of 1,040 feet.

A suspension bridge of great magnitude, connecting the city of New York with Brooklyn, was opened in 1883. The central or main span is 1,595½ feet from tower to tower, and the land spans between the towers and the anchorages 930 feet each; the approach on the New York side is 2,492 feet long, and that on the Brooklyn side 1,901 feet, making the total length 5,989 feet. The height of the platform at the centre is 135 feet above high water, and at the ends 119 feet. The roadway is 85 feet broad and is divided into five sections, the two outside for vehicles and trolley cars, the two inner for electric and cable trains, and the middle one, 12 feet above the rest, for foot passengers. The anchorage at each end is a solid cubical structure of stone, measuring 119 feet by 132 feet, rising to a height of 90 feet above high-water mark, and weighing 60,000 tons each. The towers are 278 feet high. The weight of the whole structure suspended between the towers is nearly 7,000 tons. The stress of suspension is borne by four cables of 5,296 steel wires each, 15¾ inches in

diameter. The foundations of the towers were laid by means of caissons and compressed air, at a level of about 80 feet below high-water mark. About two miles above the Brooklyn Bridge another suspension bridge, to be known as the East River Bridge, is now (1903) in process of construction. Its clear span is 1,600 feet; width, 118 feet; height, at highest point, 135 feet; total length, 7,200 feet; height of towers (which are of masonry under water and for 20 feet above, and of steel above that point), 235 feet. It is supported by four cables formed of parallel steel wires, measuring 53 inches in circumference. Its roadways comprise two elevated railroad tracks, four electric passenger-car tracks, a driveway, and two footpaths.

Movable Bridges.—The prototype of some forms of movable bridges is found in the mediæval pivot or trunnion bascule bridges, which spanned the moats surrounding fortresses or castles and which, when closed, effectually shut off communication. These bridges either revolved upon hinge pivots or trunnions in a vertical direction, or were counterbalanced on the principle of the see-saw. During the first half of the century which has just closed a number of pivot bascule bridges were built, the spans ranging from 20 to 50 feet. The year 1869 saw the completion at Copenhagen, Denmark, of the largest bascule bridge which had up to that time been constructed. Nine years later the honor of ranking as the largest bridge of this type passed to a structure at Rotterdam, Holland, which gave a clear channel of over 75 feet.

The development of the pivot bascule bridge led directly up to the invention of the rolling lift bridge, the latter type having been devised just as the Tower Bridge at London was nearly completed. This bridge consists of a suspension and a bascule bridge combined, and has three spans. Two massive towers support the suspension chains and contain machinery for working the bascule portion, which forms the central span of 200 feet. This is in separate halves, which are drawn up flush with the towers when a vessel passes. Above is a footway at the height of 140 feet, which passengers reach by means of elevators and stairs when the bascule is not available. It was commenced in 1885 and completed in 1894, and cost more than \$4,000,000. The advance which has been made in movable bridges of late years can be illustrated by comparing the Tower structure with a rolling lift bridge of greater span in Chicago. The weight of the iron and steel in the London bridge is 14,000 tons, while that in the Chicago bridge is but 2,250 tons, and the entire cost of the latter was \$126,000, less than the cost of the operating machinery alone of the Tower Bridge.

The mode of operation of the rolling lift bridge is extremely simple. On the approach of a boat the bridge seemingly splits across the middle and each half rears upright on the bank on which its shore end is resting. Electric power is used to operate these bridges and the power required is surprisingly light, the movable spans being perfectly counterbalanced and roll or rock with a minimum amount of friction. Less than 20 seconds are required for the complete operation of opening and closing the spans of one of the largest bridges, and the task is accomplished by one man. By a system of counter-weights the movable leaves comprising a

BRIDGE

bridge are so adjusted that they are at rest when opened at an inclination of about 40° , instead of in the horizontal position which they occupy when closed. Thus, as soon as the locks are withdrawn, the leaves will, without the application of any power whatever, roll back and upward and open a channel of sufficient width for the passage of vessels. An interesting record is that of the Rush Street Bridge, at Chicago, said to be the most active movable bridge in the world. During an average season of lake navigation, comprising a little over eight months, this bridge is opened between 10,000 and 11,000 times, or fully 40 times every 24 hours. Yet the power expense for the operation of this bridge by electricity does not exceed 67 cents a day.

Another form of movable bridge is that known as a swing bridge. It consists of a bridge balanced on a pivot or on a circle of rollers situated on a pier in the centre of the river. When open the bridge is swung around until it lies within the central pier and, with it, points up and down instead of athwart stream. This gives a passage on each side of the pier. The swing bridge over the Raritan River, New Jersey, gives two passages, each 216 feet wide. A similar bridge in Kansas City crosses two passages each 160 feet wide. The total moving weight is 303 tons. The bridge is opened by steam power in about one and a half minutes, or by manual power in two minutes. From two thirds to three fourths of the moving weight rests on the central pivot. Another form of swing bridge is made in two leaves which swing in to either bank and meet in the middle.

Traversing or telescope bridges are occasionally employed. They are so constructed as to be capable of being rolled horizontally backward or in an oblique direction. The bridge across the Arun, near Arundel, England, on the South Coast Railway, is 144 feet long. It is traversed on wheels, and acts as a sliding cantilever, the overhanging portion resting on the opposite abutment when in place.

Bascule or draw bridges are raised on horizontal hinges, and are made in one leaf, or in two leaves which meet in the middle. The most ancient form of the bascule was that of a flap of framed timber used to cross the moat of a castle, and capable of being drawn up by means of chains from the inside.

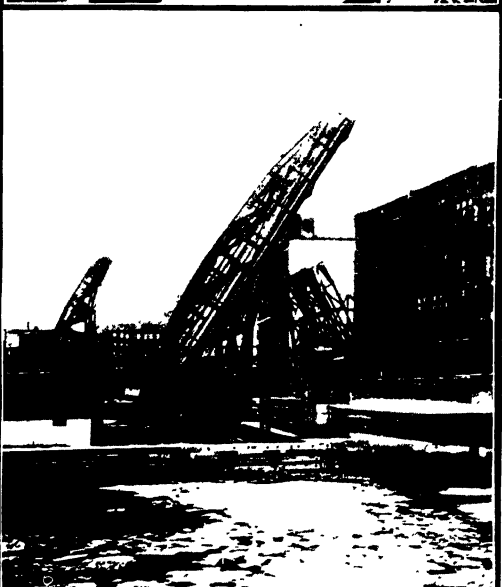
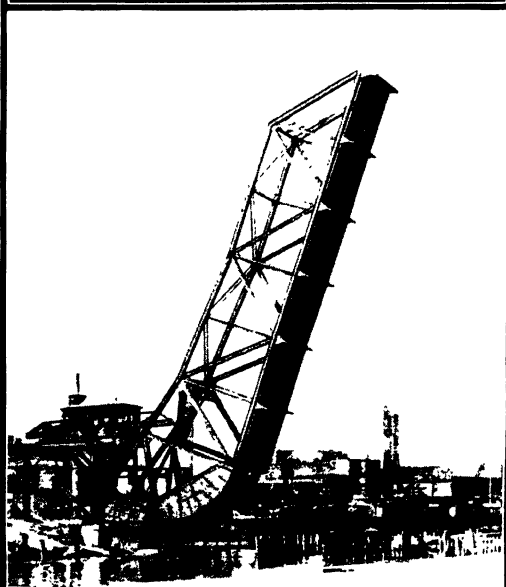
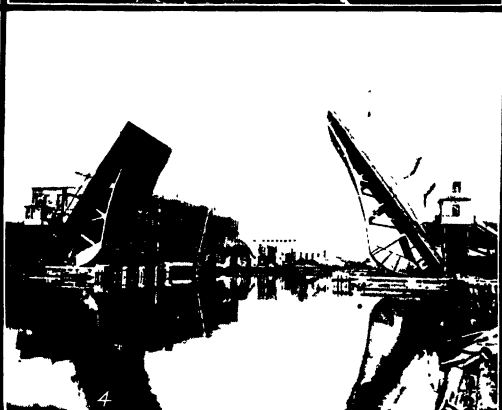
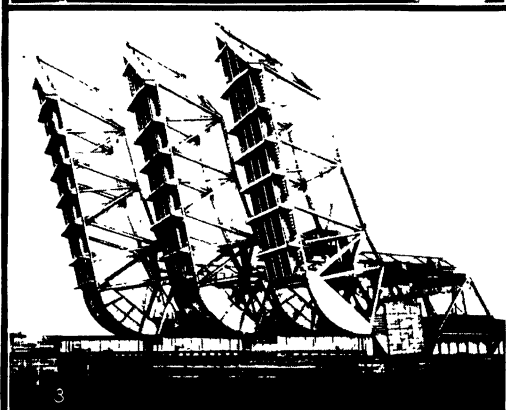
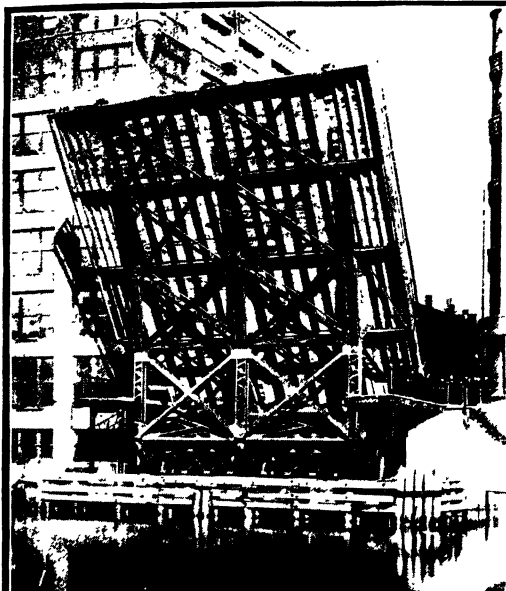
Lift bridges are contrived so as to rise perpendicularly without changing their horizontal position. This motion may be imparted by hydraulic power, by counterbalancing weights, or by means of a winch operated by hand, steam, or electrical power. Bridges of this form are used largely on the Erie Canal. One in Chicago has a clear lift of 155 feet above the water.

A flying bridge is a boat or raft anchored by a long cable up stream, and carried across by the action of the current acting obliquely against its side, which should be kept at an angle of about 55° with the current.

Pontoon Bridges.—These are a development from the ancient bridge of boats, which consisted of boats moored so as to form a continuous line, across which a roadway of planks was laid. The longest floating bridge in the world, probably, is the pontoon bridge across the Hooghly, at Calcutta, designed and constructed by Sir Bradford Leslie. The bridge is 1,530 feet long between the abutments, and is carried on 14 pairs of pontoons, which are held in position

by means of chain cables one and three quarters inches thick, and anchors weighing three tons each, laid on the up stream and down stream sides, 900 feet asunder. By their great length the cables afford the necessary spring to allow for the ordinary rise and fall of the river, the stress on each cable varying from 5 to 25 tons, according to the state of the weather and the stage of the tide, the maximum velocity of which is six miles an hour. The pontoons are rectangular iron boxes having rounded bilges and wedge-shaped ends. They are each 160 feet long, made of such considerable length in order to obviate pitching motion in rough weather, with a beam of 10 feet, and depth of from 8 to 11 feet, presenting a side of from $3\frac{1}{2}$ to 4 feet above the water, according to the state of the traffic. For perfect safety each pontoon is divided by bulkheads into 11 compartments. They are made of iron plates one fourth of an inch and five sixteenths of an inch in thickness, riveted together. The platform of the bridge is supported by trestle-work on the pontoons at a clear height of 27 feet above the water, a convenient height for boat navigation. The roadway platform is of 3-inch teak planks, and is 48 feet wide, with a footpath at each side 7 feet wide. An opening 200 feet wide, for the passage of ships, is made by removing, when occasion requires, four of the pontoons with their superstructure, and sheering them clear of the opening. The portion so removed is in two divisions, which are separately secured, right and left, and, when in place, are connected by drawbridges with the fixed portions of the bridge. Before launching, the pontoons were ballasted sufficiently to make them float upright; and were afterward coupled in pairs by the sills of the main trusses, when the ballast was removed. The floating bridge is connected with the shore at each end by adjusting ways hinged to the shore. The ordinary time taken to open the bridge is 15 minutes, and to close it, 20 minutes. It is opened only twice a week. An excellent instance of pontoon structure, though not a bridge, is the Great Landing Stage at Liverpool, England.

Military Bridges are temporary constructions to facilitate the passage of rivers by troops, to restore a broken arch, or cross a chasm of no very great width. Those over a river are either floating or fixed. The former are made of pontoons, boats, casks, rafts of timber, cotton-bales, or anything that will give sufficient buoyancy, and the latter of piles, trestles, or other timber work. Spars, ropes, and planks are used in a variety of ways for spanning narrow chasms. The pontoon bridge is the only one which is carried with an army. Enough material for 100 yards of length accompanies each army corps. All military bridges have their roadway formed in the following manner: Five to nine road-bearers of stout timber support chasses or flat planks 10 feet long, held in position, so as to form a level surface, by two ribands placed above them and over the outer road-bearers, to which they are fastened by rack lashings. The road-bearers are supported by the pontoons, casks, boats, trestles, or piles, which form the piers, usually 10 to 15 feet apart, or by transoms on the ropes in the case of suspension bridges. To prevent injury to the boats, barks of timber are built up along the keel of each for the road-bearers to rest upon. A saddle on pontoons and gunnels on casks answer the same pur-



ROLLING LIFT BRIDGES.

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¹ Van Buren Street Bridge, Chicago, Span Open.

² Van Buren Street Bridge, Chicago.

³ Six-Track Rolling

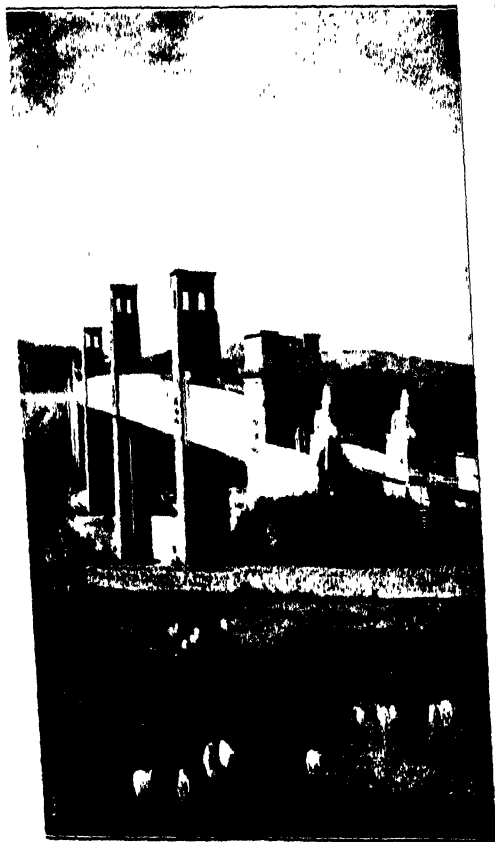


Fig. 1 Forth Bridge, from North Queensferry (from a photograph by J. Patrick & Son, Edinburgh).

2 Tay Bridge, from north end.

3 Britannia Tubular Bridge (Figs. 4 and 5 from photographs by Valentine & Sons, Limited, Dundee).

4 Crumlin Viaduct (from a photograph by Leitchford and Sapples, Newport, Mon.).

BRIDGE CONSTRUCTION

ranging from zero to 25 per cent of the total weight.

In the revision of specifications a decided tendency is observed to simplify the design by making an allowance for impact, vibration, etc., by adding certain percentages to the live load according to some well-defined system. It needs but relatively little experience in making comparative designs of bridges under the same loading, to show the advantage of this method over that in which the allowance is made in the unit stresses according to any of the systems usually adopted in such a case. Not only are the necessary computations greatly simplified, but the same degree of security is obtained in every detail of the connections as in the principal members which compose the structure.

Experiments on a large scale are very much needed to determine the proper percentage of the live load to be allowed for the effect of impact, so as to secure the necessary strength with the least sacrifice of true economy. An investigation might also be advantageously made to determine the proper ratio of the thickness of cover plates in chord members which are subject to compression, to the transverse distance between the connecting lines of rivets. The same need exists in regard to the stiffening of the webs of plate girders, concerning which there is a wide variation in the requirements of different specifications.

A movement which has done much good during the past decade and promises more for the future is that of the organization of bridge departments by the railroad companies. The great economy of making one design rather than to ask a number of bridge companies to make an equal number of designs, of which all but one are wasted, is the first advantage; but another of even greater significance in the development of bridge construction is that which arises from the designs being made by those who observe the bridges in the conditions of service and who will naturally devote closer study to every detail than is possible under the former usual conditions. The larger number of responsible designers also leads to the introduction of more new details to be submitted to the test of service, which will indicate those worthy of adoption in later designs. In order to save time and labor and secure greater uniformity in the design of the smaller bridges, some of the railroads prepare standard plans for spans varying by small distances. For the most important structures consulting bridge engineers are more frequently employed than formerly, when so much dependence was placed upon competitive designs made by the bridge companies.

An investigation was made by a committee of the Railway Engineering and Maintenance of Way Association in regard to the present practice respecting the degree of completeness of the plans and specifications furnished by the railroads. It was found that of the 72 railroads replying definitely to the inquiry, 33 per cent prepare "plans of more or less detail, but sufficiently full and precise to allow the bidder to figure the weight correctly and if awarded the contract to at once list the mill orders for material"; 18 per cent prepare "general outline drawings showing the composition of members, but no details of joints and connections"; while 49 per cent prepare "full specifications with survey plan only, leaving the bidder to submit a

design with his bid." If, however, the comparison be made on the basis of mileage represented by these 72 railroads, the corresponding percentages are 48, 24, and 28 respectively. The total mileage represented was 117,245 miles. A large majority of the engineers and bridge companies that responded were in favor of making detail plans.

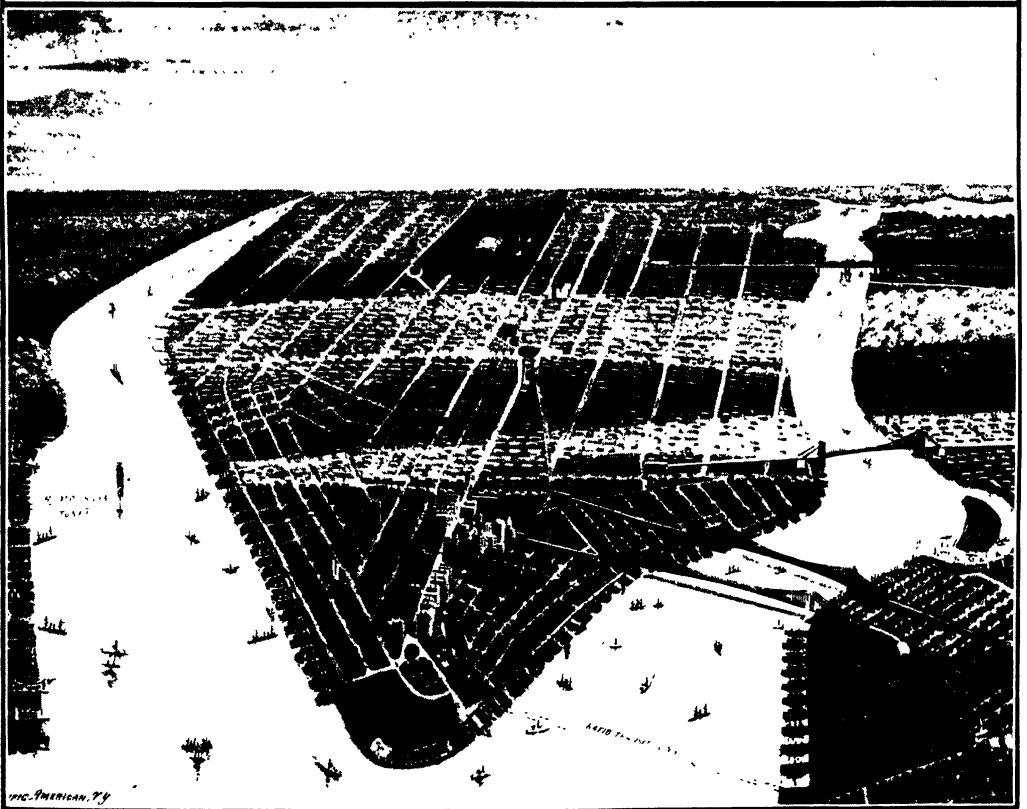
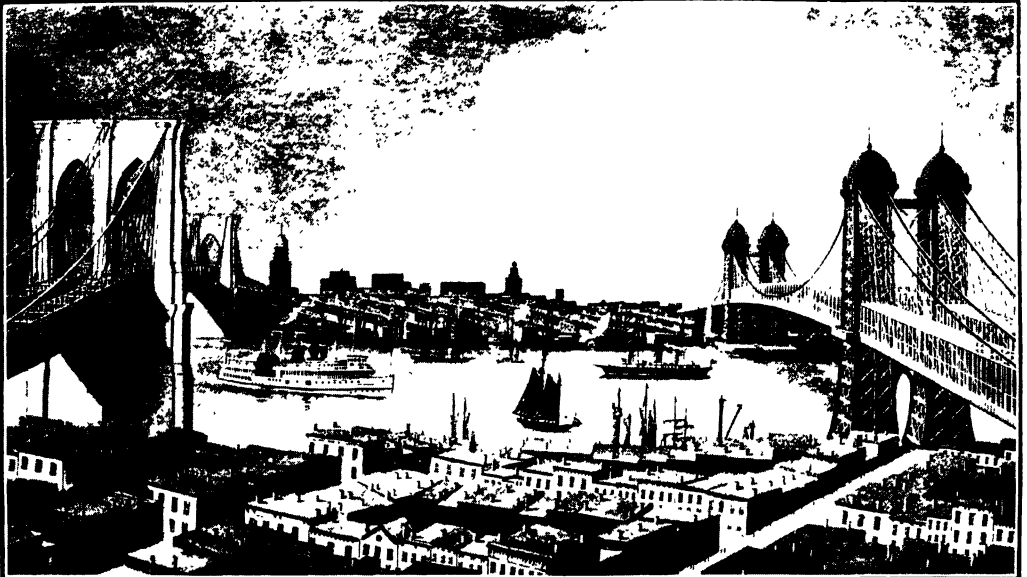
The shop drawings, which show the form of the bridge, the character and relations of all its parts, give the section and length of every member, and the size and position of every detail whether it be a reinforcing plate, a pin, a bolt, a rivet, or a lacing bar. All dimensions on the drawings are checked independently so as to avoid any chance for errors. The systematic manner in which the drawings are made and checked, and the thorough organization of every department of the shops, make it possible to manufacture the largest bridge, to ship the pieces to a distant site, and find on erecting the structure in place that all the parts fit together, although they had not been assembled at the works.

The constant improvement in the equipment of the bridge shops, and the increasing experience of the manufacturers who devote their entire time and attention to the study of better methods of transforming plates, bars, shapes, rivets, and pins into bridges, constitute important factors in the development of bridge construction.

As the length of span for the different classes of bridges gives a general indication of the progress in the science and art of bridge building, the following references are made to the longest existing span for each class, together with the increase in span which has been effected approximately during the past decade.

In plate girder bridges the girders, as their name implies, have solid webs composed of steel plates. A dozen years ago but few plate girders were built whose span exceeded 100 feet, the maximum span being but a few feet longer than this. To-day such large girders are very frequently constructed. The longest plate girder span was erected on the Mahoning division of the Erie R.R. in 1902 and measures 128 feet 4 inches between centres of bearings. The longest ones in a highway bridge are those of the viaduct on the Riverside Drive in New York, erected in 1900, the span being 126 feet. The heaviest plate girder is the middle one of a four-track bridge on the New York C. R.R. erected in 1901 near Lyons, N. Y. Its weight is 103 tons, its span 107 feet 8 inches, and its depth out to out 12 feet 2 inches.

The large amount of new construction and the corresponding increase in the weight of rolling stock have combined to secure a more extensive adoption of plate girders and the designs of many new details for them. These affect chiefly the composition of the flanges, the web splices, the expansion bearings and the solid floor system. Although solid metal floors built up of special shapes were first introduced into this country 15 years ago, their general adoption has taken place largely within the past decade on account of their special adaptation to the requirements of the elevation of tracks in cities. Solid floors may not only be made much shallower than the ordinary open type, thereby reducing the total cost of the track elevation, but they also permit the ordinary track con-



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THE BROOKLYN BRIDGE AND SUSPENSION BRIDGE, No. 3, ON WHICH WORK HAS JUST COMMENCED. EAST RIVER, NEW YORK.

BIRD'S EYE VIEW OF NEW YORK, SHOWING THE BRIDGES BUILT AND BUILDING ACROSS THE EAST RIVER.

BRIDGE CONSTRUCTION

struction with cross-ties in ballast to be extended across the bridge, thus avoiding the jar which otherwise results as the train enters and leaves the bridge, unless the track is maintained with extraordinary care.

The necessity for bridges of greater stiffness under the increased live loads has also led to the use of riveted bridges for considerably longer spans than were in use six or seven years ago. The use of pin-connected trusses for spans less than about 150 feet is undesirable for railroad bridges, on account of the excessive vibration due to the large ratio of the moving load to the dead load or weight of the bridge itself.

While riveted bridges are now quite generally used for spans from 100 to 150 feet, they have been employed to some extent up to 181½ feet. The recent forms of riveted trusses do not, however, conform to the general character of European designs, but embody the distinctively American feature of concentrating the material into fewer members of substantial construction. With but rare exceptions the trusses are of the Warren, Pratt, and Baltimore types with single systems of webbing. At a distance where the riveted connections cannot be distinguished, the larger trusses have the same general appearance as the corresponding pin bridges.

The recent examples of viaduct construction with their stiff bracing of built-up members and riveted connections exhibit a marked contrast to the older and lighter structures with their adjustable bracing composed of slender rods. The viaduct which carries the Chicago & N. W. R.R. across the valley of the Des Moines River, at a height of 185 feet above the surface of the river is 2,658 feet long. It was built in 1901, is the longest double-track viaduct in the world, provided those located in cities be excluded, and is an admirable type of the best modern construction. The tower spans are 45 feet long and the other spans are 75 feet long. Four lines of plate girders support the two tracks. Along with this viaduct should be mentioned the Viaduct Terminal of the Chesapeake & O. R.R. at Richmond, Va., whose length, including the depot branch, is 3.13 miles. A large part of this is not very much higher than an elevated railroad in cities. The excellent details and clean lines of this substantial structure give it a character which is surpassed neither in this country nor abroad. It may be added that the highest viaduct in this country, and which was rebuilt in 1900, is located 17 miles from Bradford, Pa., where the Erie R.R. crosses the Kinzua Creek at a height of 301 feet. It has a length of 2,053 feet.

While the elevated railroads which have been built recently also embody many of the characteristics of the best viaduct construction, special study has been given to improve their æsthetic effect. The use of curved brackets, of connecting plates whose edges are trimmed into curves so as to reduce the number of sharp angles, and of rounded corners of posts, constitute some of the means employed. The results are seen in the structures of the Boston Elevated R.R. and in some of the latest construction in Chicago.

The longest span of any simple truss in America is that of the bridge over the Ohio River at Louisville, erected in 1893. Its span

centre to centre of end pins is 546½ feet. Since that time several other bridges of this kind have been built which are considerably heavier, although their spans are somewhat shorter. The most noteworthy of these are the Delaware River bridge on the Pennsylvania R.R. near Philadelphia, and the Monongahela River bridge of the Union R.R. at Rankin, Pa., both of which are double-track bridges. The Delaware River bridge was erected in 1896, each one of its fixed spans having a length of 533 feet and containing 2,094 tons of steel. The Rankin bridge was erected in 1900. Its longer span has a length of 495 feet 8¼ inches between centres of end pins and contains about 2,800 tons of steel. It may also be added that the locomotive and train load for which this bridge was designed is the heaviest that has yet been specified. The heaviest simple span in this country is the channel span of the double deck bridge over the Allegheny River at Pittsburg, Pa., on the Pennsylvania lines west of Pittsburg, erected in 1902. It has four trusses and weighs about 3,000 tons.

The recent changes in the details of pin-connected truss bridges have been mainly the result of efforts to eliminate ambiguity in the stresses of the trusses, to reduce the effect of secondary stresses, and to secure increased stiffness as well as strength in the structure. Double systems of webbing have been practically abandoned so far as new construction is concerned. The simplicity of truss action thus secured permits the stresses to be computed with greater accuracy and thereby tends to economy. Before the last decade very few through bridges and those only of large span were designed with end floor beams in order to make the superstructure as complete as possible in itself and independent of the masonry supports. Now this improved feature is being extended to bridges of small spans. Similarly dropping the ends of all floor beams in through bridges so as to clear the lower chord and to enable the lower lateral system to be connected without producing an excessive bending movement in the posts has likewise been extended to the smaller spans of pin bridges and is now the standard practice. The expansion bearings have been made more effective by the use of large rollers and of bed plates so designed as to properly distribute the large loads upon the masonry. In the large spans of through bridges the top chord is curved more uniformly, thereby improving the æsthetic appearance. These chords are also given full pin bearings, thus reducing the secondary stresses.

The stiffness of truss bridges has been secured by adopting stiff bracing in the lateral systems and sway bracing, instead of the light adjustable rods formerly used. At the same time adjustable counter ties in the trusses are being replaced in recent years by stiff ones, while in some cases the counters are omitted and the main diagonals designed to take both tension and compression.

Some of the same influences referred to above have led to much simpler designs for the portal bracings by using a few members of adequate strength and stiffness in general character to those of the trusses.

Such steady progress in the design and construction of railroad bridges of moderate span has, unfortunately, no adequate counterpart in

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highway bridges. The conditions under which highway bridges are purchased by township and county commissioners are decidedly unfavorable to material improvements in the character of their details. It is a comparatively rare occurrence that the commissioners employ a bridge engineer to look after the interests of the taxpayers by providing suitable specifications, making the design, inspecting the material, and examining the construction of the bridge to see that it conforms to all the imposed requirements. These provisions are only made in some of the cities, and accordingly, one must examine the new bridges in cities to learn what progress is making in highway bridge building.

The lack of proper supervision in the rural districts and many of the smaller cities results in the continued use of short trusses with slender members built up of thin plates and shapes, whose comparatively light weight causes excessive vibration and consequent wear, as well as deterioration from rust. Under better administration plate girders would be substituted for such light trusses, making both a stiffer structure and one more easily protected by paint. The general lack of inspection and the consequent failure to protect highway bridges by regular repainting will materially shorten their life and thereby increase the financial burden to replace them by new structures. Some progress has been made by adopting riveted trusses for the shorter spans for which pin-connected trusses were formerly used, but the extent of this change is by no means as extensive as it should be, nor equal to the corresponding advance in railroad bridges.

The channel span of the cantilever bridge over the Mississippi River at Memphis, Tenn., was for some years the longest one of any bridge of this class in America. It measures $790\frac{1}{2}$ feet between centers of supports. This bridge was finished in 1892, or only two years after the close of the seven-year period of construction and erection of the mammoth cantilever bridge over the Firth of Forth in Scotland. See *BRIDGE (Cantilever Bridges)*. The cantilever bridge erected in 1903 over the Monongahela River in Pittsburg has a span a little longer than that of the Memphis bridge. It is on the new extension of the Wabash R.R. system, and the distance between pier centres is 812 feet. There is another one being built which will not only have a longer span than any other cantilever bridge in this country, but longer than that of any other bridge in the world. It is located near Quebec, Canada, and its channel span over the St. Lawrence River is to have the unprecedented length of 1,800 feet, or nearly 100 feet longer than that of the Forth cantilever bridge and 200 feet longer than the Brooklyn suspension bridge. The towers will have a height of 360 feet above high tide. It will accommodate a double-track railroad, besides two electric railway tracks and highways. In the piers the courses of masonry are four feet high and individual stones weigh about 15 tons each. The character of its design and the simplicity of its details will permit its construction with unusual rapidity and economy for a bridge of this magnitude.

The Brooklyn bridge, completed in 1883, is still the largest suspension bridge in the world, its span being $1,595\frac{1}{2}$ feet. More people cross

this bridge than any other in any country. The New East River bridge, which is now being built, has a span of 1,600 feet, and its capacity will be very much greater than that of the Brooklyn bridge. Each of its four cables has a safe strength of over 10,000,000 pounds in tension. See *BRIDGE (Suspension Bridges)*.

One of the most interesting developments relating to the subject under consideration is the construction of a considerable number of metallic arch bridges in recent years and the promise of their still greater use in the future. On account of their form they constitute one of the handsomest classes of bridges.

The first important steel bridge in the world was completed in 1874. It is the arch bridge which in three spans crosses the Mississippi River at St. Louis. Its arches are without hinges and their ends are firmly fixed to the piers. This is one of the most famous bridges in existence. For a long time after its construction no metallic arches were erected in this country, although many were built in Europe. In 1888, however, the highway bridge across the Mississippi River at Minneapolis was erected, consisting of two spans of 456 feet each and which still remains the longest span of any three-hinged arch. The following year the Washington bridge over the Harlem River in New York was completed. It consists of two spans of 510 feet in the clear and has the largest two-hinged arch ribs with solid web plates. See *BRIDGE*.

These were followed by a number of arches of various types, the most noted of which are the two arch bridges over the Niagara River. The first one is a spandrel-braced, two-hinged arch with a span of 550 feet, and replaced the Roebling suspension bridge in 1897. It accommodates the two tracks of the Grand Trunk R.R. on the upper deck and a highway on the lower deck. The other bridge has arched trusses with parallel chords and two hinges. It replaced the Niagara and Clifton highway suspension bridge in 1898, and as its span is 840 feet, it is the largest arch of any type in the world. The manner in which this arch was erected furnishes an illustration of the effort which is made by engineers to conform the actual conditions so far as possible to the theoretic ones involved in the computation of the stresses. Since the stresses in an arch having less than three hinges are statically indeterminate, stresses of considerable magnitude may be introduced into the trusses if the workmanship be imperfect, the supports not located with sufficient precision, and the arch closed without the proper means and care.

The Niagara and Clifton arch was first closed as a three-hinged arch and then transformed into a two-hinged arch by inserting the final member under the sum of the computed stress due to the weight of the truss, and that due to the difference between the temperature at which the closure was made and that assumed as standard in the stress computations. This stress was secured in the member by inserting it when the hydraulic jack which forced apart the adjacent ends of the shortened chords registered the required amount of pressure. The arch had been erected as a pair of cantilevers from each side extending 420 feet out beyond the supports, and when the closure was made the two arms came together

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within a quarter of an inch of the computed value. Such a result involving the "accuracy of the calculation and design of the entire steel work, the exactness with which the bearing shoes or skewbacks were placed, and the perfection of the shopwork" has been truly characterized as phenomenal. In order to reduce secondary stresses to a minimum the members were bolted up during the cantilever erection and the bolts replaced by rivets after the closure of the arch rib.

The past decade witnessed the introduction and extensive development of arches of concrete and of concrete-steel construction. In the latter kind a small amount of steel is embedded in the concrete in order to resist any tensile stresses that may be developed. During this period more than 150 concrete-steel bridges have been built in this country. In the same year in which the largest metallic arch was completed, the five concrete-steel arches of the bridge at Topeka, Kansas, were finished. The largest one has a span of 125 feet and still remains the largest span of this type in America, although it has been exceeded in Europe. Considerably larger spans are included in the accepted design for the proposed Memorial bridge at Washington.

It is the smaller steel structures which are destined more and more to be replaced by arches of this material. The steel bridges require repainting at frequent intervals, constant inspection, occasional repairs, and finally replacing by a new structure after a relatively short life, on account of rust and wear, unless it is required even sooner on account of a considerable increase in the live load. The concrete arch requires practically no attention except at very long intervals.

The safety of operating the traffic makes it desirable to have as few breaks as possible in the regular track construction of a railroad, and this constitutes an additional reason why concrete or stone arches are being substituted for the smaller openings. The decreasing cost of concrete tends to an extension of this practice to openings of increasing size. In 1901, however, a bridge was completed which marks a decided departure from previous practice. The Pennsylvania R.R. built a stone bridge, consisting of 48 segmental arches of 70 feet span, at the crossing of the Susquehanna River at Rockville, Pa. It is 52 feet wide, accommodates four tracks and cost \$1,000,000. This bridge has not only the advantage of almost entirely eliminating the cost of maintenance, but it also has sufficient mass to withstand the floods which occasionally wreck the other bridges on that river. In 1903 the same railroad built a similar bridge over the Raritan River at New Brunswick, N. J.

Of movable bridges the largest swing span existing was erected in 1893 at Omaha over the Missouri River. Two years later a four-track railroad swing bridge was built by the New York C. R.R. over the Harlem River in New York, which is only 389 feet long between centres of end pins, but which weighs about 2,500 tons, and is accordingly the heaviest drawbridge of any class in the world.

During the past decade a remarkable development was made in drawbridge construction by the modification and improvement of some of the older types of lift bridges and the

design of several new types. At South Halstead Street a direct-lift bridge was built in 1893 over the Chicago River, in which a simple span 130 feet long and 50 feet wide is lifted vertically 142½ feet by means of cables to which counterweights are attached. Formerly, only very small bridges of this kind were used, as those, for instance, over the Erie Canal.

In 1895 a rolling-lift bridge over the Chicago River was completed. In this new design as each leaf of the bridge rotates to a vertical position it rolls backward at one end. When closed the two leaves are locked at the centre, but they are supported as cantilevers. This form has been found to have so many advantages for the crossings of relatively narrow streams, where an unobstructed waterway is required and the adjacent shores are needed for dock room, that a score of important structures of this class have been built in different cities. The largest span that has been designed is 275 feet between centres of supports, while the widest one is to accommodate eight railroad tracks crossing the Chicago Main Drainage Canal.

About the same time and under similar conditions another type of bascule bridge was built at Sixteenth Street, Milwaukee, in which, as each leaf moves toward the shore, one end rises and the other falls, so that its centre of gravity moves horizontally, thus requiring a very small expenditure of power to operate the bridge.

Several improved forms of hinged-lift bridges have also been designed and built in Chicago and elsewhere. In a small bridge erected in 1896 on the Erie R.R. in the Hackensack meadows there is only a single leaf hinged at one end and lifted by a cable attached to the other end. The counterweight rolls on a curved track so designed as to make the counterbalance equally effective in all stages of opening and closing the bridge.

A novel bridge was built in 1902 over the ship canal at Duluth which is different from any other type in this country. The general scheme is similar to that of a design made by a French engineer who built three of the structures in different countries. It consists of a simple truss bridge 393 feet 9 inches long, supported on towers at a clear height of 135 feet above high water. Instead of supporting the usual floor of a highway bridge it supports the track of a suspended car which is properly stiffened against wind pressure and lateral vibration, the floor of the car being on a level with the docks. This ferry is operated by electricity. The loaded car, its hangers, trucks, and machinery weigh 120 tons. In the French design a suspension bridge was used instead of the simple truss bridge.

A bridge across the Charles River between Boston and Cambridge deserves especial mention and marks a decided advance in the growing recognition on the part of municipal authorities of the importance of æsthetic considerations in the design of public works. It consists of 11 spans of steel arches whose lengths range from 101½ to 188½ feet. Its width is 105 feet between railings. It is claimed that this bridge "will be not only one of the finest structures of its kind in this country, but will be a rival of any in the Old World." Its length between abutments is 1,767½ feet, and it is estimated to cost about \$2,500,000.

BRIDGE OF ALLAN—BRIDGEPORT

The problems incident to the replacing and strengthening of old bridges frequently tax the resources of the engineer and demonstrate his ability to overcome difficulties. Only a few examples will be cited to indicate the character of this work. In 1900 the Niagara cantilever bridge had its capacity increased about 75 per cent by the insertion of a middle truss without interfering with traffic. In 1897 the entire floor of the Cincinnati and Covington suspension bridge was raised four feet while the traffic was using it. It may be of interest to state that the two new cables, $10\frac{1}{2}$ inches in diameter, which were added to increase the capacity of the bridge, have just about three times the strength of the two old ones, $12\frac{1}{4}$ inches in diameter, and which were made a little over 30 years before. In the same year the old tubular bridge across the St. Lawrence River was replaced by simple truss spans without the use of false works under the bridge and without interfering with traffic. On 25 May 1902 the Pennsylvania R.R. bridge over the Raritan River and canal at New Brunswick, N. J., was moved sidewise a distance of $14\frac{1}{2}$ feet. Five simple spans 150 long and a drawbridge of the same length, weighing in all 2,057 tons, were moved to the new position and aligned in 2 minutes and 50 seconds. The actual times that the two tracks were out of service were respectively 15 and 28 minutes. On 17 October 1897, on the same railroad near Girard Avenue, Philadelphia, an old span was moved away, and a new one, 235 feet 7 inches long, put in exactly the same place in 2 minutes and 28 seconds. No train was delayed in either case.

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Bridge of Allan, a town of Scotland, in Stirlingshire, on the border of Perthshire, on the banks of the Allan, about three miles north of Stirling, with which it is connected by the Caledonian Railway and a line of tramway cars. Owing to the mildness of its climate and the beauty of its situation, Bridge of Allan is a favorite spring and autumn resort for invalids. It is built partly on a plateau of considerable height and partly on low ground on the banks of the river, and is finely laid out with trees and public walks. It is frequented partly on account of its mineral wells.

Bridge of Sighs, a bridge in Venice, dating back to 1597. It spans the Rio della Paglia, connects the ducal palace with the prisons, and forms a graceful structure 32 feet above the water, enclosed at the sides and arched overhead. It contains two passages, through which prisoners were led for trial, judgment, or punishment.

Bridgeport, Conn., a city, port of entry, and county-seat of Fairfield County, on Long Island Sound, and on the New York, N. H. & H. R.R.; 18 miles southwest of New Haven, and 56 miles northeast of New York. It is the third city in the State. The city and town are conterminous, and about 15 square miles in area. Pop. (1900) 70,996.

Bridgeport harbor is the estuary of a small tidal river, the Pequonnock, and a tidal inlet called Pembroke Lake, with a peninsula between them on which East Bridgeport, the chief manufacturing section, is built. Below the junction the harbor is about two miles long to the Sound,

and a mile wide. The main city lies along the west side to its mouth, the business centre opposite the peninsula; the shore is a plain, rising on the west to an elevation of about 70 feet called Golden Hill, the finest residence section, and commanding a beautiful view of the Sound and city. Down the Sound about three miles is the suburb of Black Rock, a favorite summer resort, with its island-guarded harbor, a great yachting rendezvous. There are three handsome parks, about 250 acres in all: Beardsley, left in great measure to its wild state, and the more charming therefor; Washington, and Seaside, of some 75 acres, on the shore west of the harbor, with a sea-wall and a two-mile drive, and monuments to the soldiers and sailors of the War, and to Elias Howe and P. T. Barnum, the sewing-machine of the one and the business enterprise of the other having largely developed the city. Of the cemeteries, the finest is Mountain Grove, of some 75 acres, near the western boundary; others are Lakeview, in east Bridgeport, and Park, in North Bridgeport. There are also two Roman Catholic cemeteries. The most notable public buildings are the government building, with the post-office and custom-house; the county court-house; the Barnum Memorial Institute, bequeathed to the Historical Society and the Scientific Society in common; the Young Men's Christian Association and the Burroughs Library buildings. Very interesting is the Barnum & Bailey circus in its winter home.

Bridgeport, like all the cities of western Connecticut, is primarily an immense gathering of the manufacturing departments of New York salesrooms; but many of them started as local Bridgeport institutions, and have remained identified with the city. These establishments are multiplying with great rapidity. By the census of 1900, there were 832, employing 20,462 workmen and supervisors, using \$33,066,890 capital, paying \$10,622,558 in wages and salaries, \$9,133,236 for materials, and turning out \$37,883,721 in products. Of these, no figures are given for the two most noted products, sewing-machines and ammunition, from their being concentrated in two or three establishments, mainly the Wheeler & Wilson Company with its 10 acres of works, and the Union Metallic Cartridge Company; but \$4,147,452 was brass castings, \$3,224,198 corsets, \$2,412,796 foundry and machine-shop products, \$1,007,244 hardware, cutlery and edge tools, \$633,577 rubber goods, \$366,585 carriages and wagons. Other products are steel bridges, ordnance and firearms, monumental bronze, bicycles, wire, velvet and plush, silk, belting, undertakers' goods, ice, fur goods, lamps, leather goods, musical instruments and graphophones, britannia, pottery, sporting goods, typewriters, carriages, and many more. The city's transportation facilities aid this growth. The railroad trackage is ample; a new station is to be built and the tracks raised, at an expense of some \$3,000,000. The harbor is safe and admits quite large vessels; there are daily steamer lines to New York, and much barge and coasting business. The river, creeks, and Pembroke Lake are spanned by two or three dozen strong bridges. Electric railway service is thoroughly developed, continuous lines running to New Haven and New York.

Education, Churches, Charities, etc.—The public school system has 22 grammar schools and

BRIDGER'S PASS — BRIDGET

a high school; in 1900 the attendance was 10,255. There is a free public library, organized in 1881, with about 40,000 volumes; four daily and several weekly newspapers. The city has the extraordinary number of 57 churches, the chief denominations being the Methodist (11), Congregationalist (10), Roman Catholic (9, with three convents), Baptist and Episcopal (6 each), and Lutheran (4), with a Jewish synagogue, a Russian Orthodox Greek and a Hungarian Orthodox Greek Catholic. Of many charitable organizations and institutions, the chief are the Young Men's Christian Association and Young Women's Christian Association, the Bridgeport Hospital, the United States Marine Hospital, and the Widows' Home. Secret societies are in great number. The oldest Masonic lodge, St. John's, dates from 1762.

Government and Finance.—The mayor is elected for two years. The city has a council and administrative boards, with a single commissioner of public works, all appointed by the mayor excepting the popularly elected school board. The city's assessed valuation is about \$64,000,000, its debt \$1,275,000, and its tax rate \$13 per \$1,000. The annual outlay is about \$1,000,000, the largest item being \$170,000 for schools. There are five national banks.

Population.—1810, 1,089; 1820, 1,500; 1830, 2,800; 1840, 3,294; 1850, 7,560; 1860, 13,209; 1870, 18,969; 1880, 27,643; 1890, 48,866; 1900, 70,996, of whom 22,281 were foreign-born.

History.—The first settlement was made in 1639, on lands bought from the Paugusset Indians, who in 1659 were relegated to a reservation on Golden Hill. It was called Pughquan-nock or Pequonnock, and formed a parish in the towns of Fairfield and Stratford, where the inhabitants went to church till they built their own first one in 1695. In 1694 they petitioned to have it renamed Fairfield; the legislature chose Fairfield Village instead; they rejected it and the next year fixed on Stratfield, which, however, was not legalized till 1701. In 1703 the first school building was erected, previous teaching having been in the church on week-days. In 1707 the first services of the Episcopalians were held; in 1748 their first church was built. In 1775 a company from here joined Arnold's expedition to Quebec; and there was much privateering from this place in the Revolution. In 1795 the first newspaper, the *American Telegraph*, was issued. In 1800 the borough of Bridgeport was incorporated, including the village of Newfield, which had grown up at the water-side, the old settlement being along the Boston and New York turnpike, or "Old Stage Road," now in part North Avenue. In 1806 the first bank, Bridgeport Bank, was organized. In 1821 the town of Bridgeport was set off, having then 1,700 inhabitants, 218 dwellings, 73 stores and warehouses, and an assessed valuation of \$24,701. On 28 Sept. 1824, the first steamer ran from Derby past Bridgeport to New York; 16 April 1832, the first Bridgeport steamer, the *Citizen*, began regular trips. The Housatonic Railroad was opened to New Milford in February 1840; the New York, N. H. & H. began running to Fairfield, 2 Sept. 1848, to New York, 1 Jan. 1849. This ushered in the period of real city development, 1850-60. Gas was introduced December 1861; water, 1854-5; P. T. Barnum bought large tracts of land in East Bridgeport and opened it

up after 1850; in 1856 the Wheeler & Wilson Company removed here from Watertown and greatly enlarged their plant; the Howe Company came in 1863, and the Union Metallic Cartridge Company in 1865. In 1870 the city annexed a part of Fairfield; in 1899 Summerfield, and West Stratford across Pembroke Lake. (See Orcutt's 'History of Stratford and Bridgeport,' 1886.)

FRANK STAPLES,
Treasurer Board of Trade.

Bridge'r's Pass, a Rocky Mountain defile in southern Wyoming, several miles in length and having a high elevation. Its walls, almost perpendicular, rise from 1,000 to 2,500 feet. Before the opening of the Pacific Railroad it was an important feature of the overland stage route.

Bridges, Fidelia, American artist: b. Salem, Mass., 19 May 1835. She studied art under William T. Richards in Philadelphia; has been associate member of the National Academy of Design from 1869, and of the American Water Color Society from 1870. She has done much landscape work, her earlier paintings being mainly executed in oil, while her later ones are usually in water colors.

Bridges, Robert, American iron-worker. Extremely little is known of him personally. He settled at Lynn, Mass., and in 1643 organized a company to work the deposits of "bog iron-ore" in that vicinity. He went to London, and organized a "Company of Undertakers for the Iron Works," comprised of wealthy Englishmen, who advanced £1,000 for the work. Foundrymen were brought from England and Scotland, a plant was established on the Saugus River, and for several years furnished most of the iron used in this country, though ultimately the undertaking failed, owing to the scarcity of money and difficulty of making collections. In 1645 Bridges was a commissioner to confer with the governors of the French provinces in Canada. The Colonial records show him to have been a member of the general court, and its speaker in 1646.

Bridges, Robert, English poet: b. 23 Oct. 1844. Educated at Eton and Corpus Christi College, Oxford, he afterward studied medicine and held several hospital appointments, retiring from the active exercise of his profession in 1882. He is one of the most scholarly of modern English poets and has published, usually privately, eight plays and several collections of poems. Among his works are 'Prometheus'; 'Achilles in Scyros'; 'Eros and Psyche'; 'Shorter Poems'; 'Milton's Prosody.'

Bridges, Robert, American author: b. Shippenburg, Pa., 13 July 1858. After graduating at Princeton he joined the staff of the *New York Evening Post*, and later became assistant editor of 'Scribner's Magazine.' For many years he wrote the keen and witty book reviews in *Life* under the signature of DROCH. His work in book form has appeared as follows: 'Humours of the Court, a Comedy, and Other Poems' (1893); 'Overheard in Arcady' (1894); 'Suppressed Chapters and Other Bookishness' (1895); 'Bramble Brae' (1902), a volume of poems.

Brid'get, the name of two saints in the Roman Catholic Church.

1. SAINT BRIGET, or SAINT BRIDE, b. Fochard, Armagh, Ireland, about the beginning of the 6th

BRIDGETON — BRIDGEWATER

century. She was exceedingly beautiful, and to avoid the offers of marriage and other temptations to which this worldly advantage exposed her, implored God to render her ugly. The prayer was granted, and, retiring from the world, Bridget built herself a cell under a large oak, hence the name Kill-dara or Kildare, the cell of the oak. Hither she was followed by numerous other virgins, and an order of nuns was established which spread into different countries and flourished for centuries. Saint Bride is one of the chief Irish saints, and was held in great reverence in Scotland.

2. **SAINT BRIDGET, BIRGIT, or BRIGITTE**, daughter of a Swedish prince: b. about 1302; d. Rome, 1373. At the age of 16 she married Ulf Gudmarssen, afterward seneschal of Nericia, by whom she had eight children. Her husband and she then made a vow of mutual continence. On her husband's death she founded the convent of Wadstena, in East Gothland, under the rules of Saint Augustine. She made a pilgrimage to Palestine, and died on her return. She was canonized in 1391. She had left, under the title 'Revelations,' a series of mystic writings, which, after due examination by the proper authorities, were pronounced inspired by Gregory XI. and Urban VI. These writings have been translated into Latin and French. The order of St. Bridget, called also sometimes that of St. Savior, or the Holy Saviour, continued in Sweden till the Reformation, and still includes some religious houses in Italy, Portugal, and other countries. Her youngest daughter, Catherine, was also canonized, and became the patron saint of Sweden.

Bridgeton, a city, port of entry, and county-seat of Cumberland County, N. J., on the Cohansey River, and on the New Jersey C. and the West Jersey & S. R.R.'s, 38 miles south of Philadelphia. It is a very old settlement, having been a place of considerable importance before the Revolutionary War. Its surroundings are agricultural, and it has manufactures of glass, gas-pipe, nails, machinery, flour, oil-cloth, woolen goods, shoes, and shirts, and also large fruit and vegetable canning interests. It has a public park, Tumbling Dam, which contains a picturesque lake and a fine field for athletics. The city contains the South Jersey Institute, the West Jersey Academy, Ivy Hall Seminary, Seven Gables Seminary, a public high school, two national banks, good water and sewerage systems, and electric lights and street railroads. Its excellent climate and scenic attractions have made the city a popular resort for summer tourists and residents. Pop. (1900) 13,913.

Bridgetown, the capital of the island of Barbados, in the West Indies. It extends along the shore of Carlisle Bay, on the southwest coast of the island, and is nearly two miles long, and about a half mile broad. On entering the port, its appearance is very pleasing, the houses being embosomed in trees, while hills of moderate height rise behind, studded with elegant villas. Many of the houses have balconies, painted in gay colors, which give them a lively and cheerful appearance. The town contains a handsome square, called Trafalgar Square, in which there is a bronze statue of Lord Nelson, placed there with great ceremony in 1813. The principal buildings include the Church of St. Michael, now the cathedral of the diocese; the Church of St.

Mary; the Jewish Synagogue; the Central School; Harrison's Free School; a handsome market-place; the barracks at the south extremity of the city; and the military hospitals. Bridgetown has been at several periods much damaged by fire. The last calamity of that kind occurred in 1845, when a large portion of the town was destroyed. Pop. over 21,000.

Bridgewater, Francis Egerton (THIRD DUKE OF), British nobleman: b. 1736; d. 8 March 1803. He was the youngest son of Scroop, fourth Earl and first Duke of Bridgewater, and succeeded his elder brother, the second Duke, in 1748. His estate of Worsley contained valuable coal mines, and with the view of establishing communication between these and Manchester, seven miles distant, he conceived the idea of a navigable canal. Having accidentally made the acquaintance of James Brindley, and perceived his great engineering talents, he employed him in the construction of this work, which, after encountering much opposition and ridicule, was at last triumphantly carried through. To the execution of this scheme the Duke devoted all his energies and fortune, restricting his expenditure for many years to £400 per annum.

Bridge'water, Francis Henry Egerton (EIGHTH EARL OF), English clergyman: b. London, 11 Nov. 1756; d. Paris, 11 Feb. 1829. He held several preferments in the English church, but his later years were spent in Paris, where he lived with a family of cats and dogs dressed as men and women, who accompanied him upon his drives. By his will he left \$40,000 to be invested in the public funds to be awarded to the author of the best treatise 'On the Power, Wisdom, and Goodness of God as Manifested in the Creation.' The selection of the author was left to Davies Gilbert, then president of the Royal Society, who decided to divide the sum among eight persons for as many treatises on various aspects of the theme. The Earl was the author of several scientific, historical, and other works, and bequeathed all his manuscripts to the British Museum with \$60,000 to keep up and extend the collection. See BRIDGEWATER TREATISES.

Bridgewater, or Bridgwater, a municipal borough and port, in the county of Somerset, England, on the Parret. Although the town is about 10 miles from the sea, vessels drawing 19 feet of water can come up to the quay at spring-tides; but great inconvenience is sometimes caused by the bore. The river divides the town into two parts, which are connected by an elegant iron bridge of one arch. The houses are generally well built, and chiefly of red brick. Among the chief buildings are the parish church (St. Mary Magdalene's), a handsome ancient structure, with a tower and spire; St. John's Church; the town hall, a handsome building in the Venetian style; corn exchange; borough jail; market-house; and custom-house. There is a free grammar school, an infirmary, and almshouses. A considerable shipping trade is carried on, chiefly coastwise. The tonnage entered and cleared annually is usually about 180,000 tons. The imports are timber, grain, coal, tallow, wine, esparto, linseed, etc.; exports, timber, bricks, etc. The chief manufacturing industry is that of bath-bricks which are made here (and indeed nowhere else) in great quantities. Ordinary bricks are also largely made, and

BRIDGEWATER — BRIDLE

there are engineering establishments, breweries, tanneries, foundries, oil-mills, etc. Bridgewater obtained its name, Burgh-Walter, from its having belonged to Walter de Douay, one of William the Conqueror's followers. In the civil war the inhabitants embraced the cause of Charles I., and defended the town resolutely against the Parliamentarians, but surrendered (1645) to Fairfax. In the castle built by King John, the Duke of Monmouth lodged, and was here proclaimed king in 1685, before the battle of Sedgemoor, which was fought about three miles from the town. Bridgewater then became the theatre of Feversham's and Jeffreys' barbarity. Up till 1870, when it was disfranchised for bribery, Bridgewater returned two members to Parliament. Pop. (1901) 15,209.

Bridgewater, a town in Plymouth County, Mass., on the New York, N. H. & H. R.R., 27 miles south of Boston. It contains five villages and has a State normal school, the State Farm, State Almshouse, a public library, a savings bank, and manufactures of iron, nails, tacks, boots, shoes, and brick. Pop. (1900) 5,806.

Bridgewater Treatises, The, works which grew out of a singular contest in compliance with the terms of the will of the last Earl of Bridgewater, who died in 1829. He left \$40,000 to be paid to the author of the best treatise 'On the Power, Wisdom, and Goodness of God, as Manifested in the Creation.' The judges decided to divide the money among the authors of the eight following treatises: 'The Adaptation of External Nature to the Moral and Intellectual Constitution of Man,' by Dr. Thomas Chalmers (1833); 'Chemistry, Meteorology, and the Function of Digestion,' by William Prout (1834); 'History, Habits, and Instincts of Animals,' by William Kirby (1835); 'Geology and Mineralogy,' by Dean (William) Buckland (1836); 'The Hand . . . as Evincing Design,' by Sir Charles Bell (1833); 'The Adaptation of External Nature to the Physical Condition of Man,' by John Kidd, M.D. (1833); 'Astronomy and General Physics,' by William Whewell (1833); 'Animal and Vegetable Physiology,' by Peter Mark Roget (1834). All these essays were published as Tracts for the Times, and have had a great circulation and influence.

Bridge Whist. See WHIST.

Bridgman, Elijah Coleman, American missionary: b. Massachusetts, 1801; d. Shanghai, China, 1861. He graduated at Amherst College, 1826, and at Andover Theological Seminary, 1829, and immediately joined Dr. Morrison at Canton. He soon attained a wonderful mastery of the Chinese language, becoming in 1839 official interpreter to Imperial Commissioner Lin, and in 1844 interpreter and secretary to the United States Minister, Caleb Cushing. He founded 'The Chinese Repository,' a magazine of the greatest value and interest for all subjects relating to the Flowery Kingdom. He compiled a Chinese 'Chrestomathy' in the Canton dialect, a quarto volume of 734 pages, and the first practical manual of that dialect prepared in China.

Bridgman, Frederick Arthur, American artist: b. Tuskegee, Ala., 10 Nov. 1847. He studied at the Brooklyn Art School, and at the National Academy of Design, New York, and was a pupil of J. L. Gérôme, and at the Ecole

des Beaux Arts, in Paris. In 1872 he went to Africa and began to paint subjects belonging to that part of the world, somewhat in the manner of Gérôme, but with a greater mastery in color. He has long resided in Paris, where he has exhibited his works with great success. He is noted for figure pieces and Oriental and archaeological pictures. Among his paintings are: 'An American Circus in Normandy'; 'L'Arabe'; 'Pharo'; and 'Burial of a Mummy,' which was awarded a prize at the Paris Exposition of 1878. He is a member of the National Academy of Design, New York, and a Chevalier of the Legion of Honor.

Bridgman, Herbert Lawrence, American journalist and explorer: b. Amherst, Mass., 1844. Graduating at Amherst College in 1866, he entered journalism and became associate editor of the *Brooklyn Standard Union*. In 1894 he accompanied and wrote an account of the Peary auxiliary expedition; in 1897 he was with Prof. Libbey of Princeton when the latter scaled the "Enchanted Mesa" of New Mexico; and in 1899 he commanded the Peary auxiliary expedition on the steamship *Diana*.

Bridgman, Laura Dewey, American blind deaf-mute: b. Hanover, N. H., 21 Dec. 1829; d. 24 May 1889. She was a bright, intelligent child, but at two years of age her sight, hearing, and smell were entirely destroyed by fever. Yet she learned to find her way about the house and neighborhood, and even to sew and to knit a little. In 1839 Dr. Samuel G. Howe, of Boston, undertook her care and education at the Perkins Institution. The first attempt was to give her a knowledge of arbitrary signs, by which she could interchange thoughts with others. Then she learned to read embossed letters by touch; next, embossed words were attached to different articles, and she learned to associate each word with its corresponding object. The next step was to procure her a set of metal types, with the letters cast at the ends, and a board with square holes for their insertion, so that they could be read by the finger. In six months she could write the names of most common objects, and in two years had made great bodily and mental improvement. Her touch grew in accuracy as its power increased; she learned to know people almost instantly by touch alone. In a year or two more she was able to receive lessons in geography, algebra, and history. She received and answered letters from all parts of the world, and was always employed, and, therefore, always happy. She learned to write a fair, legible hand, to read with great dexterity, to think and reason well, and at last became a teacher to others afflicted like herself. See her biography by Mary S. Lamson (1878).

Bridle, the headstall, bit, and reins, by which a horse is governed. It is an instrument of high antiquity. Pliny ascribes the invention of the bridle to Pelethronius, king of the Lapithæ. The first horsemen guided their horses with a rope or stick, and the sound of the voice. A cord drawn through the nose is sometimes used for other animals. The ancient Thessalian coins often represent a horse with a long rein trailing on the ground. The Romans were trained to fight without bridles, as an exercise in the manege. On Trajan's Column soldiers are thus represented at full speed. The parts of a modern bridle are the snaffle or bit; the head-

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stall, or leathers from the top of the head to the rings of the bit; the fillet, over the forehead and under the foretop; the throat-band, which buttons under the throat; the reins; the nose-band, buckled under the cheeks; the trench, the cavesan, the martingal, and the chaff-halter.

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Brienne, brĕ-ĕn, or **Brienne-le-Château**, lê-shā-tō, or **Brienne-Napoléon**, nā-pō-lē-ōn, a small town of France, department of Aube (Upper Champagne), about 23 miles northeast of Troyes, was the seat of the military academy at which Napoleon received his first instruction in the military art. Brienne-le-Château was afterward celebrated as the scene of a portion of the final struggle in 1814, in which the empire was overthrown, Napoleon being here defeated by the allies under Blücher.

Brienz, brĕ-ĕnts, a town of Switzerland, in the canton of Bern, beautifully situated on a narrow ledge at the foot of the Bernese Alps, and on the northeast shore of the Lake of Brienz. Its church, built in 1215, together with some old ruins and a handsome school, is finely situated on a height. Brienz is noted for its cheese, and as the centre of the Oberland wood-carving industry. The Lake of Brienz, one of the most picturesque in Switzerland, is formed by the river Aare, and discharges its water through the valley of Interlaken into Lake Thun, lying 24 feet below it. The lake has daily steamboat service between Brienz and Interlaken, and by this route many tourists visit the famous Giessbach Fall.

Brier Creek, a small stream rising in Warren County, Ga., flowing southeast for about 100 miles, and entering the Savannah River a few miles east of Jacksonborough. It is noted for a battle during the Revolutionary War. After the American victory on Kettle Creek, in February 1779, Gen. Ashe was sent by Lincoln at the head of about 1,500 troops to drive the British from Augusta. The British, under command of Gen. Campbell, evacuated the city, retreated to Brier Creek, and after crossing destroyed the bridge. Ashe pursued them, arrived at the creek 27 February, and there, 3 March, he was surprised by 1,800 British under Gen. Prevost. The American troops were hastily called to arms, and as the British advanced opened upon them a heavy fire, but an unfortunate movement in their line gave the enemy an advantage which decided the fortune of the day. The Americans were put to flight, many were drowned in trying to swim the Savannah, or were lost in the swamps. Their total loss was about 200 killed and wounded, and as many

others taken prisoners. The British had only 5 killed and 11 wounded.

Brierley Hill, a market-town of Staffordshire, England, on the Stour, nine miles west of Birmingham. It has several churches, a town hall, and a free library. The district abounds in coal, ironstone, and clay. The inhabitants are mostly employed in the iron rolling-mills and boiler-works, and in the making of bricks, nails, chains, anchors, spades, glass, pottery, etc. Pop. (1901) 12,040.

Brierly, Bob, the 'Ticket-of-Leave-Man,' in Tom Taylor's play of that name.

Brieuc, brĕ-ĕ, **Saint** (*Briocum*), France, a town in the department of Côtes du Nord, about a mile above the mouth of the Gouët, in the Bay of Saint Brieuc. It is very poorly built, but contains an ancient cathedral, a diocesan seminary, a school of hydrography, and a library of over 20,000 volumes. Its port, in the village of Légue, at the mouth of the river, admits vessels of 300 to 400 tons, and the town is engaged to some extent in the Newfoundland cod-fishery. On a height near it are the remains of the Tower of Cesson, which is visible 15 miles at sea. Pop. over 16,000.

Brig, a square-rigged vessel with two masts. The term is sometimes used as equivalent to brigantine, but modern American usage makes a difference. See BRIGANTINE.

Brigade, in general, an indeterminate number of regiments or squadrons. In the British army a brigade of infantry is generally composed of three regiments; a brigade of horse, of from 8 to 12 squadrons; and one of artillery, of five guns and a howitzer. A number of brigades form a division, and several divisions an army corps. A brigade-major is the chief of the brigade-staff. A brigadier-general commands a brigade. In the United States army three regiments of infantry or cavalry usually constitute a brigade, but there may be two regiments only, or more than three. The American brigade, like the British, is commanded by a brigadier-general. The brigade combination was introduced by Gustavus Adolphus, whose example was followed by Turenne, who formed brigades of 3,000 to 4,000 men. The use of the term in the French service is somewhat equivocal. In the gendarmerie, as formerly in the cavalry, a brigade is the small fraction of an army under the command of a subaltern officer. In the regular army a brigade now contains two or three regiments of infantry or cavalry, or else a mixed body.

Brigadier-General, a military officer of intermediate rank between a major-general and a colonel; the officer in the army of the United States who commands a brigade.

Brig'andine, a piece of mediæval armor, consisting of thin jointed scales of plate, generally sewed upon linen or leather, the whole forming a coat or tunic.

Brigands, a name first given during the imprisonment of King John in Paris (1358) to the mercenaries who held the city, and whose misbehavior rendered them obnoxious. Froissart applied it to a kind of irregular foot soldiery, from whom it was transferred to simple robbers. It is now used especially of such of these as live in bands in secret mountain or forest retreats. In this sense the pest has been

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BRIENNE — BRIGANDS

Brienne, brĕ-ĕn, **John of**, celebrated crusader: b. 1148; d. 1237. He was the son of Erard II., Count of Brienne; was present at the siege of Constantinople in 1204, and afterward, in 1209, married the granddaughter and heiress of Amaury, king of Jerusalem. Brienne thus obtained an empty title, and having been crowned at Tyre in 1210, defended himself, though with a very inferior force, against the attacks of the Saracens. The Emperor Frederick II., having engaged to join the crusade, provided the sovereignty of the Holy Land were ceded to him, Brienne abdicated in his favor, and gave him his eldest daughter, Yolande, in marriage. He afterward, in 1222, married Berengaria, sister of Ferdinand of Castile, as his second wife, and retired from the East; but the state of affairs there again brought him on the stage. He was crowned Emperor of the East in 1231, and continued to defend his dominions against all aggressors, more especially against the united forces of Vataces, emperor of Nicæa, and Azan, king of Bithynia.

Brienne, brĕ-ĕn, or **Brienne-le-Château**, lê-shā-tō, or **Brienne-Napoléon**, nā-pō-lĕ-ōn, a small town of France, department of Aube (Upper Champagne), about 23 miles northeast of Troyes, was the seat of the military academy at which Napoleon received his first instruction in the military art. Brienne-le-Château was afterward celebrated as the scene of a portion of the final struggle in 1814, in which the empire was overthrown, Napoleon being here defeated by the allies under Blücher.

Brienzen, brĕ-ĕnts, a town of Switzerland, in the canton of Bern, beautifully situated on a narrow ledge at the foot of the Bernese Alps, and on the northeast shore of the Lake of Brienzen. Its church, built in 1215, together with some old ruins and a handsome school, is finely situated on a height. Brienzen is noted for its cheese, and as the centre of the Oberland wood-carving industry. The Lake of Brienzen, one of the most picturesque in Switzerland, is formed by the river Aare, and discharges its water through the valley of Interlaken into Lake Thun, lying 24 feet below it. The lake has daily steamboat service between Brienzen and Interlaken, and by this route many tourists visit the famous Giessbach Fall.

Brier Creek, a small stream rising in Warren County, Ga., flowing southeast for about 100 miles, and entering the Savannah River a few miles east of Jacksonborough. It is noted for a battle during the Revolutionary War. After the American victory on Kettle Creek, in February 1779, Gen. Ashe was sent by Lincoln at the head of about 1,500 troops to drive the British from Augusta. The British, under command of Gen. Campbell, evacuated the city, retreated to Brier Creek, and after crossing destroyed the bridge. Ashe pursued them, arrived at the creek 27 February, and there, 3 March, he was surprised by 1,800 British under Gen. Prevost. The American troops were hastily called to arms, and as the British advanced opened upon them a heavy fire, but an unfortunate movement in their line gave the enemy an advantage which decided the fortune of the day. The Americans were put to flight, many were drowned in trying to swim the Savannah, or were lost in the swamps. Their total loss was about 200 killed and wounded, and as many

others taken prisoners. The British had only 5 killed and 11 wounded.

Brierley Hill, a market-town of Staffordshire, England, on the Stour, nine miles west of Birmingham. It has several churches, a town hall, and a free library. The district abounds in coal, ironstone, and clay. The inhabitants are mostly employed in the iron rolling-mills and boiler-works, and in the making of bricks, nails, chains, anchors, spades, glass, pottery, etc. Pop. (1901) 12,040.

Brierley, Bob, the 'Ticket-of-Leave-Man,' in Tom Taylor's play of that name.

Briec, brĕ-ĕ, **Saint** (*Briocum*), France, a town in the department of Côtes du Nord, about a mile above the mouth of the Gouët, in the Bay of Saint Briec. It is very poorly built, but contains an ancient cathedral, a diocesan seminary, a school of hydrography, and a library of over 20,000 volumes. Its port, in the village of Ligué, at the mouth of the river, admits vessels of 300 to 400 tons, and the town is engaged to some extent in the Newfoundland cod-fishery. On a height near it are the remains of the Tower of Cesson, which is visible 15 miles at sea. Pop. over 16,000.

Brig, a square-rigged vessel with two masts. The term is sometimes used as equivalent to brigantine, but modern American usage makes a difference. See BRIGANTINE.

Brigade, in general, an indeterminate number of regiments or squadrons. In the British army a brigade of infantry is generally composed of three regiments; a brigade of horse, of from 8 to 12 squadrons; and one of artillery, of five guns and a howitzer. A number of brigades form a division, and several divisions an army corps. A brigade-major is the chief of the brigade-staff. A brigadier-general commands a brigade. In the United States army three regiments of infantry or cavalry usually constitute a brigade, but there may be two regiments only, or more than three. The American brigade, like the British, is commanded by a brigadier-general. The brigade combination was introduced by Gustavus Adolphus, whose example was followed by Turenne, who formed brigades of 3,000 to 4,000 men. The use of the term in the French service is somewhat equivocal. In the gendarmerie, as formerly in the cavalry, a brigade is the small fraction of an army under the command of a subaltern officer. In the regular army a brigade now contains two or three regiments of infantry or cavalry, or else a mixed body.

Brigadier-General, a military officer of intermediate rank between a major-general and a colonel; the officer in the army of the United States who commands a brigade.

Brigandine, a piece of mediæval armor, consisting of thin jointed scales of plate, generally sewed upon linen or leather, the whole forming a coat or tunic.

Brigands, a name first given during the imprisonment of King John in Paris (1358) to the mercenaries who held the city, and whose misbehavior rendered them obnoxious. Froissart applied it to a kind of irregular foot soldiery, from whom it was transferred to simple robbers. It is now used especially of such of these as live in bands in secret mountain or forest retreats. In this sense the pest has been

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common to most countries, by whatever name the robbers may have been known—whether the escaped slaves and gladiators of Rome, the pre-Islamite brigands of Arabia, English outlaws and highwaymen, German robber nobles, the later banditti of Mediterranean countries and of Mexico, American stage-coach robbers, Australian bushrangers, or the dacoits and hill robbers of Asia. It has ever flourished under weak or corrupt governments, and patriotism at times has swelled its ranks, always largely recruited from those disposed readily to join in any political movement, and has transformed them into guerrilla companies, who have carried on a bitter warfare against the invader. Such Spanish bands harassed the French during the Peninsular war; in Italy the Austrian troops were frequently engaged in expeditions against the banditti led by the daring Bellino (*"Il Passatore"*), and in Greece the Klephts rendered brave and worthy service in the war of independence. In Cuba, in 1888, political discontent was made the excuse for the brigandage then rampant in the island, where four provinces were on this account declared in a state of siege. Religious persecution also has encouraged brigandage; in Bosnia, which has always produced the most perfect specimens of bandits, it was formerly very common, the unhappy Christians, who were reduced by the Turks to the condition of serfs, frequently taking to the mountains in despair, and then wreaking vengeance on their oppressors. Generally speaking, in countries with a notably scanty population, which is yet in many districts as notably overcrowded, brigandage will be found still in existence. Vigorous steps have been taken during the last 50 years to repress the practice, and in some countries with signal success. In Greece, organized companies of brigands, as distinguished from bands of highway robbers, fortuitously collected, have disappeared; and, in Italy, the chiefs with whom princes made treaties are found only in history. Nevertheless, brigandage is by no means obsolete. In Hungary, where it has flourished from time immemorial, and where even the free towns in the 15th century enrolled companies for organized rapine, and thus raised it to the height of an institution, it has found a stronghold in the shades of the Bakony Forest, whose swineherds are said to be in league with the bétarys, and even to do an occasional stroke of business on their own account. In Sicily it is to be feared that this is still the only trade which really prospers in the island (see *MAFIA*); and the bands that infest the Turkish frontier are notoriously dangerous to the wayfaring merchant and the defenseless tourist. In 1887 special attention was attracted by the boldness of brigands in the Pyrenees, Tuscany, Servia, Macedonia, Asia Minor, and Mexico.

Brigantes, brî-găn'têz, the name of the most powerful of the old British tribes, inhabiting the country between the Humber and the Roman wall.

Brig'antine, a sailing-vessel with two masts, the foremast rigged like a brig's, the mainmast rigged like a schooner's; also called "hermaphrodite brig." The term is applied to different kinds of vessels by mariners of different countries. The term "brigantine" was formerly applied to a light, flat, open vessel, with 10 or 15 oars on a side, furnished also with

sails, and able to carry upward of 100 men. The rowers, being also soldiers, had their muskets lying ready under the benches. Brigantines, being very fast sailers, were frequently made use of, especially in the Mediterranean, for the purpose of piracy, from which fact they derived their name.

Briggs, Charles Augustus, American clergyman and author: b. New York, 15 Jan. 1841. For a number of years he was pastor of the Presbyterian church at Roselle, N. J. In 1874 he was appointed professor of Hebrew in Union Theological Seminary, New York. He was tried for heresy in 1892, and was acquitted. In 1897 he formally severed his connection with the New York Presbytery and became a clergyman of the Protestant Episcopal Church. He is one of the foremost Biblical scholars in the world, and the Episcopal Church in this country might be searched in vain to find his equal as a teacher of Hebrew and the cognate languages and as an authority in that department of learning, or even one who is entitled to be put in the same class with him. Among his works are: 'American Presbyterianism' (1885); 'The Bible, the Church, and the Reason' (1892); 'The Higher Criticism of the Hexateuch' (1893); 'The Messiah of the Gospels' (1894); 'The Messiah of the Apostles' (1895).

Briggs, Charles Frederick, American author and journalist: b. Nantucket, Mass., 1804; d. Brooklyn, N. Y., 20 June 1877. Throughout his life he was engaged in journalism in New York, and under the pseudonym of **HARRY FRANCO** was widely known. In 1844 he founded the 'Broadway Journal,' and for a time Edgar Allen Poe was his associate editor. He was connected with 'Putnam's Magazine' (1853-6); the *New York Times*, the *Evening Mirror*, the *Brooklyn Union*, 1870-4, and the 'Independent.' Publications: 'Harry Franco; a Tale of the Great Panic' (1837); 'The Haunted Merchant' (1843); 'Working a Passage' (1844); 'Trippings of Tom Pepper' (1847); 'Seaweeds from the Shores of Nantucket' (1853); and in collaboration with Augustus Maverick, 'The Story of the Telegraph, and a History of the Great Atlantic Cable' (1858).

Briggs, George Nixon, American politician: b. Adams, Mass., 13 April 1796; d. Pittsfield, Mass., 12 Sept. 1861. He was governor of Massachusetts from 1844 to 1851, and one of the founders in that State of the Republican party. He spent one year at an academy, studied law, was admitted to the bar in 1818, and soon established a reputation as one of the best criminal lawyers in the State. From 1831-43 he was a representative in Congress, serving through one Congress as chairman of the Post-Office Committee. During his term as governor extraordinary efforts were made to induce him to pardon Prof. Webster, the murderer of Dr. Parkman, but he refused to interpose. For 16 years he was a trustee of Williams College, and at all times a noted advocate of temperance. His death was the result of an accident received from a gun. His life has been written by W. C. Richards under the title of 'Great in Goodness.' (1866).

Briggs, Henry, English mathematician: b. Warley Wood, Yorkshire, 1561; d. Oxford, 26 Jan. 1631. He entered St. John's College, Cambridge, and distinguished himself by his ac-

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quirements in mathematics. In 1506 he was appointed first lecturer on geometry in the newly elected establishment of Gresham House or College, London, and in 1619 became in like manner first Savilian professor of geometry at Oxford. This professorship he held till his death. Briggs' great works are his *'Logarithmorum Chilias Prima'* (1617); *'Arithmetica Logarithmica'* (1624); *'Trigonometria Britannica'* (1633).

Briggs, Le Baron Russell, American educator: b. Salem, Mass., 11 Dec. 1855. He was graduated from Harvard University in 1875, was assistant professor of English there, 1885-90, and professor from 1890. Since 1891 he has been dean of the university. He has written *'Old Fashioned Views of Modern Education'*; *'Original Charades'*; *'School, College, and Character.'*

Brigham, brĭg'ām, Amariah, American physician: b. New Marlborough, Mass., 26 Dec. 1798; d. Utica, N. Y., 8 Sept. 1849. He began practice at Enfield, Mass., about 1821, but soon removed to Greenfield, where he became widely known for his skill as a surgeon. In 1828 he went to Europe and spent a year studying in the hospitals. In 1831 he settled in Hartford, Conn., and in 1840 was appointed superintendent of the retreat for the insane there. Two years later he accepted a similar position at the State Lunatic Asylum, Utica, N. Y., where he remained till his death. He was a skilful business man, an able physician, and was frequently called to act as an expert in the courts. Publications: *'Treatise on Epidemic Cholera'* (1832); *'Influence of Mental Cultivation on the Health'* (1833); *'Influence of Religion upon the Health and Physical Welfare of Mankind'* (1835); *'Inquiry Concerning the Diseases and functions of the Brain, the Spinal Cord, and Nerves'* (1840); *'The Asylum Souvenir'* (1849); *'Mental Exertion in Relation to Health'* (1866). See C. E. Goodrich, *'Sermon on the Death of Amariah Brigham'* (1850).

Brigham, Sarah J. (LATHURY), American illustrator and writer for young people: b. Manchester, N. Y., 1835. She was married to J. R. Brigham in 1854. She has written: *'Under Blue Skies'* (1886); *'Leopold and His Wheel'* (1896); *'The Pleasant Land of Play'* (1898); *'The Bond of Honor.'*

Brigham, William Tufts, American ethnologist: b. Boston, Mass., 24 May 1841. He was admitted to the Massachusetts bar in 1867, was for a year botanical instructor at Harvard and served for a time on the Boston school board. He removed to Honolulu in 1888, and has since been in charge of the Bishop Museum of Ethnology there. He has published: *'Cast Catalogue of Antique Sculpture'*; *'Guatemala, the Land of the Quetzal'*; *'Volcanic Manifestations in New England.'*

Bright, Charles, English civil engineer: b. London, 25 Dec. 1863. He is the youngest son of Sir Charles Tilston Bright, who laid the first Atlantic cable, and has been himself employed in cable-laying in many parts of the world, as well as on various surveying expeditions. He has published *'Science and Engineering During the Victorian Era'*; *'Submarine Telegraphs'*; *'Underground Cables'*; *'Ancient Methods of Signalling'*; *'The Evolution of the Electric Telegraph, 1837-97'*; *'The Life of Sir Charles*

Bright'; *'Imperial Free Trade'*; *'Imperial Telegraphy.'*

Bright, James Franck, English historical writer: b. London, 29 May 1832. He was educated at Rugby, and University College, Oxford, and was master at Marlborough College and head of the modern department there for 16 years. Since 1874 he has been dean of University College, and honorary Fellow of Balliol from 1878. He has written *'History of England to 1880'*; *'Joseph II.'* (1897); *'Maria Theresa'* (1897).

Bright, Jesse D., American politician: b. Norwich, N. Y., 18 Dec. 1812; d. Baltimore, Md., 20 May 1875. He received an academic education, was admitted to the Indiana bar (1831), and became a circuit judge, State senator, and lieutenant-governor. From 1845 to 1857 he was a United States senator and president of the Senate during several sessions. Re-elected in 1857, he was expelled for alleged disloyalty, 5 Feb. 1862, the chief evidence against him being a letter addressed to "His Excellency, Jefferson Davis, President of the Confederation of States," recommending a friend who had an improvement in firearms to dispose of. Bright maintained that at the date of the letter (March 1861) he had no idea that there would be war, and wrote it to get rid of the inventor. Subsequently, he settled in Kentucky, and in 1866 was elected to the State Senate.

Bright, John, English statesman and orator: b. Greenbank, Rochdale, Lancashire, 16 Nov. 1811; d. 27 March 1889. His father, Jacob Bright, who belonged to a Quaker family originally connected with Wiltshire, migrated to Rochdale early in the century, and there established himself as a successful cotton-spinner and manufacturer. John Bright, who was the second of 10 children, was educated at Rochdale, Ackworth, York, and finally at Newton, near Clitheroe. At the age of 15 he entered the cotton-spinning business of his father, where, even at that early age, he showed much shrewdness and practical energy. Not satisfied, however, with merely mercantile affairs, he took an enthusiastic interest in such public questions as the abolition of slavery and the Reform Bill of 1831-2, while he diligently educated himself in public speaking at the debates of the Rochdale Literary and Philosophical Society. In 1835 he traveled in Greece, Egypt, and Palestine, and gave an account of the journey in a series of lectures delivered in his native town; but his career as a notable public speaker began with the free-trade movement. To relieve the pressure upon the working population of England occasioned by commercial depression and a bad harvest, it was proposed to cheapen bread by the repeal of the corn duty, and in an association formed for this purpose at Manchester in 1838 Mr. Bright was made a member of committee. In the following year this association, at a meeting in London, was widened into the famous Anti-Corn Law League, with Richard Cobden and John Bright as its two most prominent members. Yet it was not until after the death of his first wife, in 1841, that the latter put all his strength into the repeal campaign. In the autumn and winter of that year he organized branches of the League and addressed meetings in nearly all the large towns of England. It was inevitable that such a prom-

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inent politician should find a place in Parliament, and accordingly, in 1843, he was elected as representative of the city of Durham. Having entered Parliament, he made his maiden speech in August of the same year on a motion in favor of carrying out the recommendations of the Import Duties Commission of 1840. Thereafter he seized every opportunity to press this question of repeal. The opposition from both of the great parties in the house was dogged, and the controversy might have lasted long but for the widespread sympathy occasioned by the Irish famine. In January 1846 Parliament was summoned, and Sir Robert Peel announced that his government was prepared to reduce and almost abolish the corn duties. This resolution was carried, but on the question of Irish coercion the government was defeated, and at the general election which followed (1847), John Bright was elected for Manchester. The corn duty question having been satisfactorily settled, he now turned his attention to such subjects as a reform in the affairs of Ireland and India, an extension of the suffrage, the adoption of voting by ballot, and the establishment of a national system of education. At the dissolution of Parliament in 1852 he was re-elected for Manchester, but by his strenuous denunciation of the Crimean war (1854), and his equally decided disapproval of the Chinese war (1856), he was rejected by his constituency at the general election of 1857. This result was made known to him at Florence, where he had retired to recruit after a serious illness, but the disappointment which it caused him was mitigated in a few months by his election for Birmingham, and in 1858 he returned to public life after an absence of two years. During the American Civil War he sturdily advocated the abolition of slavery, and gave his passionate adherence to the cause of the North, although as a Lancashire cotton-spinner his business suffered severely from a continuance of the struggle. About this time, also, his name became closely identified with reform in the electoral representation, and he had the satisfaction of seeing the principles for which he had contended embodied in the Reform Bill (1867) passed by Mr. Disraeli. He had no desire for office, but his presence in the cabinet councils of the Liberal party had now become so necessary that he was constrained to accept the presidency of the Board of Trade in Mr. Gladstone's government (1868), and in this position he gave powerful assistance in passing the act for the disestablishment of the Irish Church, the Irish Land Act, and the Elementary Education Act. Owing to ill health he retired from office in 1870, but re-entered the ministry as chancellor of the duchy of Lancaster in 1873. When the Liberal party returned to power in 1880 he again accepted this position, but two years later he found it necessary to resign because he disagreed with his colleagues on their Egyptian policy and the bombardment of Alexandria. At this time and for some years previously he had not appeared often upon public platforms, but in 1883 he delivered a notable speech when installed as lord rector of Glasgow University, and another in Birmingham in the same year when celebrating the 25th anniversary of his connection with that city. In 1886 he opposed the Home Rule Bill introduced by Mr. Gladstone, and until his death he strongly identified himself with the Unionist party in its efforts to defeat the Home Rule policy. This

opposition was weighted with the same characteristics which had secured his success in previous movements—a transparent sincerity of purpose which found its fearless exposition by pen and speech in direct, racy, idiomatic English. As an orator his platform manner was remarkable for its ease and unstudied simplicity; the richness and lucidity of his diction, abounding in happy epithets, often edged with irony or glancing with humor; a spirit of outspoken truthfulness breathing through all his utterances: while he was possessed of a voice which laid a spell upon his audience by its clear, round, sonorous fullness. Perhaps the most splendid expression of his sympathetic nature is found in the speeches in which he pleaded for justice to the oppressed populations whether in Ireland or India, while the same broad humanity, even more than the doctrines which were his Quaker birthright, animated his denunciations of war. He was a member of the Society of Friends, and was married first to a Miss Priestman, who died in 1841, and again to a Miss Leatham, who died suddenly in 1878. His life and speeches in two volumes were published in 1881 by G. Barnett Smith, and his public letters by H. J. Leech in 1885.

Bright, Richard, English physician: b. Bristol, 28 Sept. 1789; d. 16 Dec. 1858. He studied at Edinburgh, Berlin, and Vienna. His name is associated with Bright's disease (q.v.), he being the first who investigated its character.

Brightly, Frederick Charles, American lawyer: b. Bungay, England, 26 Aug. 1812; d. Germantown, Pa., 24 Jan. 1888. He came to the United States in 1831, and was admitted to the Philadelphia bar (1839). In 1870 he retired to devote himself to legal writing and compilation, for which he had pre-eminent gifts. His private law library of 5,000 volumes was one of the best collections in America. Publications: 'Law of Costs in Pennsylvania' (1847); 'Reports of Cases Decided by the Judges of the Supreme Court of Pennsylvania' (1851); 'Equitable Jurisdiction of the Courts of Pennsylvania' (1855); 'Analytical Digest of the Laws of the United States, 1789-1869' (1865-9); 'Digest of the Decisions of the Federal Courts' (1868-73); 'Bankrupt Law of the United States' (1871); 'Leading Cases on the Law of Elections' (1871); 'Digest of the Laws of Pennsylvania, 1700-1883' (1883); and other works.

Brighton (formerly BRIGHTHELMSTONE), a maritime town and favorite watering-place in England, county of Sussex, 50½ miles south of London. It is situated on a gentle slope, and is a clean and well-built town, with handsome streets, terraces, squares, etc., and a massive sea-wall, with a promenade and drive over three miles in length, one of the finest in Europe. The buildings of note are entirely modern, and not numerous. The most remarkable is the Pavilion, built by George IV. (then Prince of Wales), between 1787 and 1825. It cost upward of \$5,000,000. It is a building in the Oriental style of architecture, with a handsome stone front 300 feet in length, and a large Oriental dome 84 feet high in the centre. The Pavilion was discontinued as a royal residence by Queen Victoria in 1841, and was purchased of the Crown by the town of Brighton in 1850. Pop. (1901) 123,478.

BRIGHT'S DISEASE — BRINDISI

Bright's Disease. See KIDNEY.

Brigittines, or **Order of Our Saviour**, a branch of the Augustinians, founded about the year 1344 by Saint Bridget of Sweden, and approved by Urban V. in 1370. It owes its origin to the monastery built by Bridget at Wastein, near Linköping, in Sweden. It embraces both monks and nuns, who occupy contiguous buildings. The prioress is superior in temporal concerns, but spiritual matters are managed by the monks. All the houses of the order are subject to the bishop of the diocese, and no new one can be founded without express permission of the Pope. The number of male religious in each monastery was fixed by the rule at 25, and that of females at 60; but this regulation has ceased to be strictly enforced. Indeed, there are few establishments for both sexes now existing, though some are yet maintained in Germany, Flanders, and other countries; most of them, including the parent house at Wastein, were destroyed at the Reformation. There are two rich convents of Brigittines at Genoa, into one of which only ladies of high family are admitted. The only house of the order in England was the rich institution known as Sion house, founded by Henry V. on the Thames, 10 miles from London. It was one of the first suppressed by Henry VIII. After passing through the hands of the dukes of Somerset and Northumberland, it was restored to the religious by Queen Mary, and again dissolved under Elizabeth. The nuns then left England, and after various troubles established themselves in Portugal.

Brignoles (BRINONIA), a town in France, department of Var, 22 miles west-southwest of Draguignan. It is the seat of a normal school for the department, and of courts of first resort. Here are manufactures of common cloth, silk, crockery, soap, wax candles, and glue, and distilleries, tanneries, and silk and fulling mills. The neighborhood produces olive-oil and large quantities of excellent prunes, called "prunes de Brignoles." The town was taken and sacked in 1524 by Charles V.

Brignoli, Pasquale, bre-nyó'lē pā-skwa'lē, Italian tenor: b. Naples, 1824; d. New York, 29 Oct. 1884. After singing with success in concert and opera in the chief European cities, he came to the United States in 1855, and for 30 years was one of the most popular opera tenors in this country in spite of the fact that he was an awkward, mediocre actor. His voice was unusually flexible, and its carrying power very great.

Brigs of Ayr, the title of a poem by Robert Burns, giving an imaginary conversation between the old and new bridges over the Ayr River.

Brhaspati, brī-hūs'pā-tē, a Hindu deity frequently mentioned in the Rig-Veda, but of lesser importance in subsequent Indian mythology. His name often appears as Brahmanapati, "lord of strength." The Vedas describe him as having seven mouths, seven rays, a hundred wings, sharp horns, and armed with a hatchet and bow and arrows. See Dowson, 'Dictionary of Hindu Mythology' (1879); Macdonel, 'Vedic Mythology' (1897).

Brihuega, brē-ā'gwa, a town of Spain, in New Castile, on the Fajuna, 20 miles northeast of Guadalajara. Here 9 Dec. 1710 the French, under the Duke de Vendôme, defeated the allies commanded by Lord Stanhope.

Bril, the name of two Dutch painters, (brothers), who distinguished themselves as landscape artists. (1) MATTHEW, b. Antwerp, 1550; d. 1584. When a very young man he went to Rome, and was so much esteemed by Gregory III. that he was employed on the galleries and salons of the Vatican. (2) PAUL, b. about 1556; d. about 1626. He was much superior to Matthew, and hearing of his success at Rome joined him there. The two brothers appear for some time to have worked together on the same pieces; but after Matthew's early death Paul was employed by Sixtus V., and executed six large paintings in his summer palace. He also executed a fresco 68 feet long, and proportionably high, in the Sala Clementina of the Vatican for Clement VIII. Its subject is the martyrdom of St. Clement. His chief merit is the improvement he effected in landscape painting, which he is said to have been the first to raise to the dignity of an independent branch of art. In the latter part of his life he painted some exquisitely finished miniature landscapes on copper.

Brill, or **Pearl** (*Rhombus vulgaris*), a fish resembling the turbot, but inferior to it both in size and quality, and distinguished from it by its inferior breadth and by the perfect smoothness of its skin, being devoid of bony tubercles. The brill is of a pale-brown color above, marked by scattered yellowish or reddish spots, and covered with scales of moderate size. It is found on many parts of the British coast, and is particularly abundant in the English Channel, from which large quantities are sent to the London market. Though inferior in flavor to the turbot, its flesh is of good quality.

Brillat-Savarin, Anthelme, bre-yä'sä-vä-ran', French author: b. Belley, 1 April 1775; d. Paris, 2 Feb. 1826. He was a deputy to the National Convention in 1789; emigrated in 1793; and passed some time in the United States; returned to France in 1796. Under the Directory and the Consulate he held several offices. His writings were mostly anonymous, and his title to fame rests on 'Physiologie du Goût' (1825), a book on the social implications of gastronomy, written in elegant style, and with profound knowledge of the subject-matter.

Brilliant. See DIAMOND.

Brimstone. See SULPHUR.

Brindāban, brin-da-bān', or **Bindrában**, a town of the Northwest Provinces, British India; on the Jumna, six miles north of Muttra. It is one of the sacred cities of the Hindus, and crowds of pilgrims go there from all parts of India, more particularly in honor of Krishna; and, through the munificence of wealthy devotees, there are a large number of temples and shrines. Pop. 31,600.

Brindisi, bren'dē-sē, (ancient BRUNDISIUM), a seaport and fortified town in the province of Lecce in southern Italy, 45 miles east-northeast of Taranto. In ancient times Brundisium was one of the most important cities of Calabria. It was one of the chief cities of the Sallentines, and the excellence of its port and commanding situation in the Adriatic

were among the chief inducements to the Romans to attack them. The Romans made it a naval station, and it was the scene of important operations in the war between Cæsar and Pompey. Virgil died here 19 B.C. On the fall of the western empire it declined in importance. In the 11th century it fell into the possession of the Normans, and became one of the chief ports of embarkation for the Crusades. Its importance as a seaport was subsequently completely lost, and its harbor blocked. In 1870 the Peninsular & Oriental Steam Navigation Company put on a weekly line of steamers between Brindisi and Alexandria, and Brindisi is now an important station for passengers and mails to and from India and the East. There is also a trade with British, Austrian, and other ports. Latterly the harbor accommodation has been considerably improved. The chief exports are wine, olive-oil, and figs; the chief import, coal. Pop. (1901) 25,317.

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BRISACH — BRISSAC

A briquette is simply an admixture of coal dust with pitch, molded under pressure and heat, the pitch or some similar substance being introduced to form the cementing material.

Brisach. See BREISACH, ALT.

Brisbane, brîz'bân, Sir Thomas MacDougall, Scottish general and astronomer: b. Brisbane, near Largs, the seat of his family, 23 July 1773; d. there, 27 Jan. 1860. He entered the army and in 1793 took part in all the engagements of the campaign in Flanders. In 1796 he was sent to the West Indies, and in 1812 commanded a brigade under the Duke of Wellington in Spain. He took part in the battles of Vittoria, Orthes, and Toulouse, and received the thanks of Parliament for conspicuous bravery at the battle of the Nive. On the abdication of Napoleon he was sent to America. In 1821 he was appointed governor of New South Wales, which post he continued to occupy for four years. His administration was active and intelligent, and tended greatly to promote the prosperity of the colony. He introduced at his own expense a good breed of horses, and promoted the cultivation of the vine, as well as of sugar, cotton, and tobacco. At the same time he devoted himself with great diligence to the study of astronomy. He had an observatory erected at his residence of Paramatta, and catalogued 7,385 stars, until then scarcely known to astronomers. For this great work, known as the 'Brisbane Catalogue of Stars,' he received the Copley medal of the Royal Society. On his return to Scotland he devoted himself entirely to science. He had an astronomical, and later a magnetic observatory established at his residence at Makerstown. The observations which he made there, with the aid of able assistants, fill three large volumes of the published 'Transactions' of the Royal Society of Edinburgh, of which he was president from the death of Sir Walter Scott. He founded two gold medals for scientific merit, one in the gift of the Royal Society, the other in that of the Society of Arts.

Brisbane, the capital of the colony of Queensland, Australia, on the Brisbane River, about 25 miles by water from its mouth in Moreton Bay, and about 500 miles north of Sydney. It was named in honor of Sir Thomas Brisbane (q.v.). Of the four parts into which the town is divided, North Brisbane is situated in the heart of the city, on the north bank of the river, and South Brisbane faces it on the south. Fortitude Valley is a large division on the north bank, to the east and northeast of North Brisbane, mostly situated on a peninsula formed by the winding of the river. The fourth division, Kangaroo Point, is on the south bank, comprising a point of land projecting between North Brisbane and the above peninsula. The streets are laid out as regularly as the tortuous course of the river will permit. The chief buildings are situated in North Brisbane, among them being Parliament House, where the legislature sits; Government House, in the Botanic Gardens; the government offices; the supreme court; the post-office; the technical college; the treasury buildings, a large structure of great architectural beauty; the old and the new town-hall; and the customs-house. Many of the banks have fine edifices, particularly the Queens-

land National Bank. The chief educational institutions are the Normal School, the boys' and girls' grammar schools, and the school of the Christian Brothers. Other buildings and institutions are the masonic and temperance halls the School of Arts, with a good library; the museum; the Queensland Club; the large general hospital, and several special hospitals; an orphanage and a large jail in South Brisbane the Opera House, one of the best theatres in Australia. The Victoria Bridge connects South with North Brisbane. It cost upward of \$555,000, and replaces an older one destroyed by a flood in 1893. It consists of six steel spans supported on five cast-iron cylinders filled with concrete, the abutments being of masonry and concrete; and the total length is about 1,044 feet. Much of the cross-river traffic is carried on by the ferries. The leading parks and gardens are the Botanic Gardens, with the Queen's Park, in North Brisbane, at the river-side finely laid out; Victoria Park, to the north of North Brisbane; Albert Park, Mount Coot-tha Bowen Park, and the gardens of the Acclimatization Society in Fortitude Valley; and Musgrave Dutton, and Woolloongabba parks in South Brisbane. There is extensive wharf accommodation, and South Brisbane has a dry-dock. There is regular steamer connection with Sydney, London, and elsewhere, and adequate railway communication with Sydney and other chief towns in Australia. The climate is dry and healthy, but the temperature is often very high during the summer. Among the industrial establishments are a sugar-refinery, tobacco factories, flour-mills, etc. The trade is important among the exports being gold, wool, sugar, etc. Originally founded as a penal settlement in 1825 Brisbane was incorporated in 1859. A United States consul is stationed here. Pop. (1896) estimated at 100,913.

Briscoe, Margaret Sutton. See HOPKINS MARGARET SUTTON BRISCOE.

Brise'is, a girl of Lyrnessus, called also HIPPODAMIA. When her country was taken by the Greeks, she fell to the share of Achilles in the division of the spoils. Agamemnon afterward took possession of her, and Achilles thereupon made a vow to absent himself from the field of battle at Troy. This incident Homer makes one of the chief features of his 'Iliad.'

Brisgau, brêz'gow, or **Breisgau**, a district of the grand-duchy of Baden, between the Rhine and the Black Forest, which, with the district of Ortenau, formerly constituted a land-graviate in the southwestern part of Swabia. This is one of the most fertile parts of Germany. Though chiefly in possession of Austria since the 15th century, it was governed by its own laws. At the Peace of Lunéville (1801) Austria ceded Brisgau, one of the oldest possessions of the House of Hapsburg, to the Duke of Modena, after whose death it fell to his son-in-law, the Archduke Ferdinand of Austria, as Duke of Brisgau. By the Peace of Presburg (1805) it was assigned to Baden, with the exception of a small part, and still belongs to the grand-duchy.

Brissac, brê-sâc, Count de. See COSSÉ, CHARLES DE.

Brisson, Barnabé, bar-na-bā brē-sôn, French jurist: b. 1531; d. 15 Nov. 1591. Henry III. commissioned him to collect and edit the ordinances of his predecessors and his own, which appeared under the title 'Code de Henri III.' In 1589, he was made first president of the parliament, and after Henri's death, in August of the same year, proclaimed the Duke de Mayenne, the Chief of the League, lieutenant-general of the kingdom. Brisson soon after became suspected by the faction of the "Sixteen," who ruled in Paris, and who thought that he was favorable to Henri IV. He was accordingly arrested and summarily hanged. Among his works of importance are: 'De Verborum Quæ ad Jus Pertinent Significatione, etc.' (1557); 'Observationum Divini et Humani Juris Liber' (1564); 'De Formalis et Solemnibus Populi Romani Verbis, etc.' (1583), still in use; 'Opera Minora' (1606).

Brisson, Eugène Henri, è-zhān òn-rē, French politician and journalist: b. Bourges, 31 July 1835. He entered the chamber of deputies in 1871, and won much attention by urging amnesty for the Communists and other political offenders. Since then he has been one of the foremost members of the Radical party. He was elected president of the chamber in 1881, and retained that office until the overthrow of the Ferry ministry, in 1885, when he accepted the premiership. He was re-elected to the presidency of the chamber in 1894, and, in 1895, he retired from the ministry and was a conspicuous candidate for the presidency of France. In 1898 he again accepted the premiership, but his cabinet was soon overthrown on the army question.

Brisson, Mathurin Jacques, ma-too-rāñ zhak, French savant: b. Fontenay-le-Comte, 30 April 1723; d. Versailles, 23 June 1806. He was instructor to the children of the royal family of France in physics and natural history. He was also censor royal, member of the Academy of Sciences, and of the Institute, and succeeded Nollet in the chair of natural philosophy at the College of Navarre. He translated Priestley's work on 'Electricity,' although he opposed his theories, and still more those of Franklin. The most able of his writings are on specific gravity and on ornithology. Buffon quotes frequently from Brisson's 'Ornithologia' (1760). He published in 1800 a 'Dictionnaire raisonné de physique.'

Brisson de Warville, Félix Saturnin, fā-lèks sa-toor-nāñ brē-sō de var-vêl, French animal painter: b. Sens, 1818. His paintings are renowned for their truthful representations of nature, their scenes being laid chiefly in Touraine and Normandy, or in the forests of Fontainebleau and Compiègne. Among them are: 'The Thicket' (1881); 'Return of the Flock' (1885); 'A Corner of the Sheepfold' (1888).

Brisson de Warville, Jean Pierre, zhōñ pē-ār brē-sō de var-vêl, French political writer, and one of the leaders of the Girondists: b. Ouarville, near Chartres, 14 Jan. 1754; executed, Paris, 30 Oct. 1793. He took the name D'Ouarville, which he afterward anglicized into De Warville, from the village of Ouarville, where he was born. He was designed for the law, and placed with a procurator in Paris; but early turned his attention to public affairs, asso-

ciating himself with such men as Pétion, Robespierre, Marat, etc. In 1780 he published his 'Théorie des Lois Criminelles,' and two years afterward an important collection called the 'Bibliothèque des Lois Criminelles.' During this period he edited for a time, at Boulogne-sur-Mer, the 'Courier de l'Europe', a translation from an English journal. He also visited England, where he endeavored to found a lyceum and establish a journal in connection with it. Failing in this enterprise, he returned to Paris, where his works had already classed him among the philanthropic theorists of the day. He was suspected of the authorship of an anonymous pamphlet, and thrown into the Bastille. On his liberation he engaged with Clavières and Mirabeau in some works on finance, which appeared under the name of the latter. Threatened with a new arrest, he escaped to England, and being there introduced to the Society for the Abolition of Negro Slavery, resolved to form a similar society in Paris. This society, which numbered many distinguished names among its members, and ultimately accomplished its object, he founded along with Clavières, Mirabeau, and others, and undertook a voyage to the United States to study on its behalf the problem of emancipation. On his return the Revolution was about to break out, and Brissot embraced it with ardor. He was not a member of the States-general, but was elected to the National Assembly for Paris and to the Convention for the department of the Eure et Loir. As leader of the Girondist party, his history belongs henceforward to the history of France. He voted, out of policy, for the death of Louis XVI., subject to confirmation by the vote of the people; and he caused war to be declared against Holland and England in February 1793. This was his last political act. Until the close of his career he was engaged in defending himself against the Montagnards. Brissot was inferior to Vergniaud as an orator, but his writings exercised a powerful influence on the Revolution. In the early part of his career his opinions were very extreme. In a passage, afterward used against him, he carried his advocacy of individual rights so far as to justify not only theft, but cannibalism. Proudhon was accused of having borrowed from him the maxim, "La propriété c'est le vol." His 'Mémoires pour servir à l'histoire de la Révolution' appeared in 1830.

Brissotins, brē-sō-tān. See GIRONDISTS.

Bristed, Charles Astor, American author: b. New York, 1820; d. Washington, D. C., 15 Jan. 1874. He was the son of the Rev. John Bristed, and grandson of John Jacob Astor, founder of the Astor Library. He graduated with high honors at Yale in 1839, and then spent five years at Trinity College, Cambridge, England, where he took a number of prizes and became a foundation scholar. He traveled extensively, and contributed many papers on light social topics and ephemeral subjects to the magazines of England and America. His wide culture and exact scholarship made his work attractive to all cultivated readers. He wrote 'Selections from Catullus' (1849); 'Letter to Horace Mann' (1850), a reply to certain attacks on Stephen Girard and J. J. Astor; 'The Upper Ten Thousand' (1852); 'Five Years in an English University' (1852), his most impor-

BRISTLE-TAILS — BRISTOL

tant book; 'Pieces of a Broken-Down Critic' (1858); 'Letter to Dr. Henry Halford Jones (that is, Dr. J. G. Holland), editor of the Wintertown Democrat (that is, Springfield Republican), concerning his habit of giving Advice to Everybody and His Qualifications for the Task' (1864); 'The Interference Theory of Government' (1867). Most of his work was published under the pseudonym of CARL BENSON.

Bristle-tails, wingless insects of the order *Thysanura*. These agile creatures, which are revealed by turning over stones and sticks in damp situations, and are often seen about houses, have a long flattened body, with metallic scales, in form somewhat like those of butterflies. The antennæ are very long, setiform, many-jointed; the mouth-parts are free, with long palpi; the maxillary palpi being seven-jointed and the labial palpi four-jointed. The mandibles are stout, sunken in the head, and armed with teeth for gnawing. The prothorax is very large, and all the rings of the body are of much the same size, so that the insect bears a general resemblance to the myriapods. The anal stylets are long and large, which, with the smaller ones inserted on the subterminal rings of the abdomen, aid greatly in locomotion, though these insects run with great rapidity and do not leap like the *Poduridæ*, and thus remind us, as well as in their general appearance, of certain wingless cockroaches. Like cockroaches in one of its habits also is *Thermobia domestica*, which abounds in the chinks and crannies of the rouges of houses, and comes out at night, shunning the light. This species loves hot and dry localities, in distinction from the others, which seek moisture as well as darkness. By some they are called "silver witches," and as they dart off, when disturbed, like a streak of light, their bodies being coated in a suit of shining mail, which the arrangement of the scales resembles, they have a weird and ghostly look.

The "silver witch" (*Hepisma saccharina*), is not uncommon in old, damp houses, where it has the habits of the cockroach, eating cloths, tapestry, silken trimmings of furniture, and doing occasional damage to libraries by devouring the paste, and eating holes in the leaves and covers of books.

In general form, *Lepisma* may be compared to the larva of *Perla*, a net-veined neuropterous insect, and also to the narrow-bodied species of cockroaches, minus the wings. The body is long and narrow, covered with rather coarse scales, and ends in three many-jointed anal stylets, or bristles, which closely resemble the many-jointed antennæ, which are remarkably long and slender. They undergo no metamorphosis, the young being of the same shape as the adults. Consult: Packard, 'Our Common Insects' (1873); Sharp, 'Insects' (1899); also the monographs of Grassi, Oudemans, Sylvestri, etc.

Bristles, the stiff hairs which grow upon the back of the hog, and are used to a great extent in the manufacture of brushes, and by shoemakers and saddlers in the place of needles. They are of several varieties of color and quality, distinguished as black, gray, yellow, white, and lilies. The last is the soft, silvery quality used for shaving-brushes. The demand is so great for the manufacture of the various kinds of brushes, that bristles are an important article

of commerce. Russia and Germany are the chief sources of supply, but they are also obtained from France and Belgium, and large quantities of inferior quality have recently been received from China. The quality of bristles depends on the length, stiffness, color, and straightness—white being the most valuable. The best bristles are produced by hogs that inhabit cold countries. The Russian hog is a long, spare animal, and the thinner the hog, the longer and stiffer the bristles. When it is sent to the south and fattened the bristles become soft, and, of course, depreciated in value. In the summer the hogs are driven in herds through the forests, to feed on soft roots, etc., when they shed their bristles by rubbing themselves against the trees. The bristles are then collected, sewed up in horse or ox hides, and sent to fairs, whence they find their way, through agents, to all countries.

Bristol, *Augusta Cooper*, American writer and lecturer: b. Croydon, N. H., 17 April 1835. She was married to Louis Bristol in 1866. She was State lecturer to the Patrons of Husbandry of New Jersey (1881-4), and is the author of 'Poems' (1868); 'The Relation of the Maternal Function to the Woman Intellect' (1876); 'The Philosophy of Art' (1880); 'The Present Phase of Woman's Advancement' (1880); 'Science as the Basis of Morality'; 'The Web of Life,' a collection of poems, (1895).

Bristol, Conn., a town in Hartford County, on the New England R.R., 17 miles west of Hartford. It has a public library, electric light and street railroad plants; national and savings banks; manufactories of clocks, brass goods, table ware, tools, woolen and knit goods, and bicycle and other bells. It was incorporated as a borough in 1893. Pop. (1900) 6,268.

Bristol, a city of England, situated partly in Gloucestershire, partly in Somersetshire, but forming a county in itself. It stands at the confluence of the rivers Avon and Frome, whence the Avon pursues a course of nearly seven miles to the Severn. The Avon is a navigable river, and the tides rise in it to a great height. Bristol is due west from London, and distant 118 miles. It stands partly on a number of eminences, partly on the lower ground at their foot. The manufacturing and business parts are upon the lower levels, while the hills are now almost wholly covered with private houses. The districts of Clifton, Redland, and Cotham, situated within the limits of the borough and in the midst of charming scenery, are studded with mansions and villas, the attractions of these portions of the city being greatly increased by the Clifton and Durdham Downs. The bed of the river Avon is situated about 315 feet below the summit of Clifton Down, from which a handsome suspension bridge is thrown across the river, uniting the two counties. Its length from the centres of the piers is 703 feet, its height above high-water mark 245 feet. The public buildings of Bristol are numerous and handsome. The number of places of worship is very great, there being few sects with any following at all in the United Kingdom that are not represented. The first place is due to the cathedral, which was founded in 1142, and was originally an abbey church. It exhibits various styles of architecture, the chapter house

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and its vestibule being Norman, the Lady Chapel early English; the chancel and choir, the Berkeley and Newton chapels decorated; the groining of the transepts, the central tower, and cloisters perpendicular. The nave, its aisles, and western towers are modern additions, having been erected at intervals since 1865. There are several fine old churches, but they are all excelled by St. Mary Redcliff, perhaps the finest parish church in the kingdom. It is commonly said to have been founded by Simon de Burton, about 1293, but part of it is considerably older than this, and is believed to be as old as 1200. It is cruciform, with western tower and spire. The western door is the principal entrance, but there are also porches on the northern and southern sides. The south porch, the south transept, the tower, and much of the lower part of the church belong to the decorated style, and the north porch is an exquisite specimen of it, the interior in particular being very beautiful. The remainder of the church, including the clerestory, is of the Perpendicular period. William Canynge or Canning, mayor of Bristol, whose name is so prominent in the Chatterton controversy, is said to have restored this church about 1445-7. Other churches worthy of notice are Temple Church, with its leaning tower, St. Stephen's, St. Mary-le-port, St. Philip's, St. James', and St. John's. Under the tower of this last church was one of the entrances to the ancient city of Bristol, and the gateway still exists. The Independents, Baptists, and Wesleyans have some noteworthy chapels. The Roman Catholics have a pro-cathedral in Clifton, and several chapels and convents. For public meetings there are two large halls, one in Clifton, called the Victoria Rooms, the other, more immediately in the centre of the city, called Colston Hall, destroyed by fire in 1898, but since rebuilt. Bristol is rich in modern as well as in ancient architecture, the most modern public building being the Cabot Tower, on Brandon Hill, inaugurated in 1898. The charities of Bristol are exceedingly numerous, the Ashley Down Orphanage, for the orphans of Protestant parents, being the most remarkable. It is situated without the limits of the borough upon an eminence to the north-northeast of the city. This institution was started in 1836 by the Rev. George Muller, and managed by him till his death in 1898. The principal institution for the higher education is the University College, opened in 1876, and having a medical school attached to it. The Baptists have a college in which young men are trained for the ministry. Clifton College, which supplies a high-class education to some 600 boys, was opened in 1862. The Merchant Venturers' Technical College is an institution of recent origin. There are also three schools of art, and blind and deaf and dumb asylums. At Clifton there are zoological gardens. The Public Libraries Act was adopted in 1874, and the chief library is based upon an ancient city library which received a site as early as 1613. There are in addition six district libraries. There is also a large reference library attached to the Bristol Museum. Street cars for passengers from Bristol to various suburbs began to run in 1875. Electric traction (overhead wire system) exists already, and is to be applied to the whole system.

Bristol has long been famous for its glass-works, potteries, soap-works, tanneries, tobacco factories, chocolate factories, and chemical works, as well as for its ship-building and machinery yards. Coal is found and worked extensively within the limits of the borough. Bristol carries on an export and import trade with all parts of the world. The United States, Canada, South America, the West Indies, Australia, France, Belgium, Spain, Italy, Germany, Russia, Norway, Sweden, and Denmark all have a good share of the trade. Cereals and flour are the most important imports, others being cheese, butter, bacon, cattle, sugar, timber, petroleum, hides. The total value of imports and exports in 1900 was over \$63,500,000. The total tonnage entered and cleared at Bristol in 1899 was over 2,900,000. The present dock system comprises a dock of 19 acres at Avonmouth on the Gloucestershire bank of the Avon, one of 12 acres (deep-water area) at Portishead, on the Somersetshire bank of the river, two miles below Avonmouth, and a floating harbor of 70 acres in the heart of the city. Bristol traders colonized Newfoundland and established commerce with the West Indies and the American colonies. The city has long been known for its ship-building interests, and the Great Western, the first steamship to cross the Atlantic, was built at Bristol in 1838. A United States consul is stationed here.

Bristol is one of the healthiest of the large towns of Great Britain. The electric lighting of the city is said to be one of the best in the United Kingdom.

The Celtic name of Bristol was *Cacr Oder*, or the City of the Chasm (namely, through which the Avon flows). The name Bristol is derived from the Anglo-Saxon *brig*, a bridge, and *stow*, a place. It was early a place of commerce. Between 1239 and 1247 a new channel was dug for the Frome in order to provide better accommodation for shipping. In the reign of Edward II. Bristol rebelled against the royal authority and was held by the citizens against the sovereign for four years. In 1373 it was constituted a county of itself by Edward III. It was made the seat of a bishopric by Henry VIII. in 1542. During the civil war between Charles I. and the Parliament it declared in favor of the latter, but was stormed and taken by the Royalists under Prince Rupert. After the battle of Naseby it was taken by Fairfax, and its formidable castle was razed to the ground. In 1831 the Reform agitation gave origin to riots that lasted for several days. The rioters destroyed various public and private buildings, among which was the bishop's palace, and a number of them lost their lives. Bristol was united as a bishop's see to Gloucester in 1837. The first bishop of Bristol and Gloucester united was James Henry Monk, created in 1837. By the Bristol Bishopric Act Bristol was again separated from Gloucester, and Dr. Forrest Browne was enthroned, 28 Oct. 1897. Sebastian Cabot, Chatterton, and Southey were natives of Bristol. The borough is governed by 21 aldermen and 63 councilors, one of whom is mayor; and it returns since 1885 four members to Parliament, having formerly returned two. Pop. (1901) 328,842. See Latimer, 'Bristol' (1898); Nicholl and Taylor, 'Bristol, Past and Present' (1880); Masse, 'The Cathedral Church of Bristol' (1900).

BRISTOL — BRITAIN

Bristol, N. H., a town in Grafton County, 32 miles north from Concord. It is at the junction of the Pemigewasset and New Found rivers; is the terminus of the Bristol branch of the Boston & M. R.R., and has become a place of summer resort. It has a public library, and flannel, wooden ware, and paper manufactories. Pop. (1900) 1,600.

Bristol, Pa., a borough in Bucks County; on the Delaware River, the Pennsylvania R.R., and the Pennsylvania Canal; 21 miles northeast of Philadelphia. It has a national bank, high school, electric light and street railroad plants, a noted mineral spring, and manufactories of carpets, hosiery, and foundry products. It is in a rich fruit and truck farming region, and is the centre of considerable trade. It was originally called Buckingham, and was settled in 1681. A ferry connects it with the town of Burlington on the New Jersey side of the Delaware. Pop. (1900) 7,104.

Bristol, R. I., a town and county-seat of Bristol County, on Narraganset Bay, and the New York, N. H. & H. R.R., 15 miles southeast of Providence. It has an excellent harbor, facilitating a large daily passenger and freight service for Fall River and Providence. It is the seat of the widely known Herreshoff ship-building works, where a number of noteworthy sailing and steam yachts and torpedo boats have been constructed; and also of the Saunders & West yacht-building yards. The town has a handsome brown stone library building containing some 15,000 volumes, eight churches, 17 public schools, large market gardening and coast trade interests, and manufactories of rubber, woolen, and cotton goods. Bristol is the site of the residence of King Philip, the great Narraganset chief. Pop. (1900) 6,901.

Bristol, Tenn., a city in Sullivan County, and Washington County, Va.; on several railroads; 130 miles east by northeast of Knoxville. The boundary line between Tennessee and Virginia runs east and west along the main street of the city. Bristol is the seat of King's College (Presbyterian), Sullins College, and the Southwest Virginia Institute for young ladies; and is principally engaged in the manufacture of tobacco, cotton and woolen goods, iron, lumber, and leather. The present city charter provides for two city councils, one for each State, and a mayor, elected biennially. Pop. (1900) 5,271.

Bristol Bay, an arm of Bering Sea, lying immediately to the north of the peninsula of Alaska. It receives the waters of two large lakes, by which communication with the interior is opened up for a considerable distance.

Bristol Board, a fine kind of pasteboard, smooth, and sometimes glazed, on the surface, employed in water-color painting and other similar artistic work. It was first manufactured at Bristol, England.

Bristol Brick, or Bath Brick, a kind of brick used for cleaning steel, manufactured for some years exclusively in Bridgewater and Bristol, England. A small vein of the sand required for this purpose was found near Liverpool, but was soon exhausted. One of the owners or operatives, who had been concerned in the works at Bristol, visited the United States in 1820, where by accident he discovered that the same kind of sand which was used for the

Bristol bricks might be procured at South Hampton, N. H. Since that period, bricks fully equal to the imported article have been manufactured in this country, with a large and constantly increasing demand.

Bristol Channel, an arm of the Irish Sea, extending between the southern shores of Wales and the western peninsula of England, and terminating in the estuary of the Severn. It is about 90 miles long, and from 15 to 50 miles wide. It is remarkable for its high tides and the rapidity with which they rise. At Chepstow spring-tides rise as high as 60 feet. On its coast are situated the towns of Cardiff, Swansea, Ilfracombe, Tenby, etc. It receives the waters of the Usk, Severn, Wye, Avon, Parrott, Taw, and Torridge rivers. At the entrance of the channel is Lundy Island.

Bristol, or Bristow Diamonds, small, round crystals of quartz, found in the Clifton limestone, near the city of Bristol in England. They are used as ornaments.

Bristow, Benjamin Helm, American lawyer: b. Elkton, Ky., 20 June 1832; d. 22 June 1896. He was admitted to the bar in Kentucky in 1853. He served with distinction in the Civil War, and at its close was appointed United States district attorney of Kentucky. In 1874 he became secretary of the treasury, and made his name memorable by the exposure and prosecution of a notorious whiskey ring. He removed to New York in 1876, and had an extensive legal practice there.

Bristow, George Frederick, American musician: b. Brooklyn, N. Y., 1825; d. New York, 1898. From 1851 to 1862 he was the conductor of the New York Philharmonic Society, and later of the Mendelssohn Union. The greater part of his life was spent as an organist in the churches, and as a teacher in the public schools of New York. He wrote 'Rip Van Winkle,' an opera produced in New York 1855; 'Daniel,' an oratorio (1867); 'Arcadian Symphony' (1874); and 'The Great Republic,' a cantata (1880).

Bristow Station, now **Bristoe**, Va., a village in Prince William County, four miles southwest of Manassas Junction. On 27 Aug. 1862 a drawn battle took place here between the Federal army under Gen. Hooker, and a Confederate one under Gen. Early, and on 14 Oct. 1863, the Federal troops under Gen. Warren repulsed with severe loss a Confederate attack under Gen. A. P. Hill.

Brisure, brē-zoor', any part of a parapet or rampart constructed in a direction different to that part of the fortification of which it forms a continuous portion. In field works, the term brisure is applied to the faces of a star fort, or those of any line of defensive works consisting of a series of re-entering and salient angles.

Brit, (1) a name applied by whalers to the food of the baleen whale, which consists usually of surface swimming or pelagic copepod crustacea, and pteropod mollusks, such as *clione*, etc. (2) A fisherman's name for certain "small fry," as young herring, when met with in great numbers.

Britain. See GREAT BRITAIN.

Britain, Ecclesiastical History of, by the Venerable Bede, or Bæda (673-735). Bede was

by far the most learned Englishman of his time; one of the greatest writers known to English literature; in a very high sense "the Father of English History"; an extensive compiler for English use from the writings of the Fathers of the Church; an author of treatises representing the existing knowledge of science; and a famous English translator of Scripture. A recent authority calls him "the greatest name in the ancient literature of England"; and Green's 'History' says of him: "First among English scholars, first among English theologians, first among English historians, it is in the monk of Jarrow that English literature strikes its roots. In the 600 scholars who gathered round him for instruction, he is the father of our national education." It was in point of view and name only that Bede's great work was an ecclesiastical history. It covered all the facts drawn from Roman writers, from native chronicles and biographies, from records and public documents, and from oral and written accounts by his contemporaries. It was written in Latin; first printed at Strasburg about 1473; King Alfred translated it into Anglo-Saxon; and it has had several editions and English versions in recent times.

Britain, New. See NEW BRITAIN.

Britan'nia, the ancient name of Britain. Under the name of Britannia, Great Britain is personified as a helmeted woman seated on a globe or an insulated rock, leaning with one arm on a shield, and the other grasping a spear or trident.

Britannia Metal, an alloy that has come into very general use in modern times, many domestic utensils, such as spoons and teapots, being made of it. Such articles are commonly electro-plated, and made to resemble real silver. It consists chiefly of tin and antimony, but often contains also a small quantity of copper, zinc, and bismuth. A common proportion is 140 parts of tin, three of copper, and nine of antimony; but the best alloy is composed of 90 parts of tin and 10 of antimony. The copper is used mainly to impart color to the combination. The manufacture of the metal was introduced into England about 1770. Queen's metal is one of the varieties of Britannia metal.

Britannia Tubular Bridge, an iron tubular bridge across Menai Strait, which separates Anglesea from Wales, about one mile from the Menai suspension bridge. It has two principal spans of 460 feet each over the water, and two smaller ones of 230 feet each over the land; constructed 1846-50. See BRIDGES.

Britan'nicus, the son of the Roman emperor, Claudius, by Messalina: b. about 42 A.D.; poisoned 55 A.D. He was passed over by his father for the son of his new wife Agrippina. This son became the Emperor Nero, whose fears that he might be displaced by the natural successor of the late emperor caused him to murder Britannicus.

British America, the general name for the whole northern part of the North American continent beyond the territory of the United States. It extends from lat. 41° to 78° N., and from lon. 52° to 141° W. The frontier line between British America and the United States was determined by the conventions of 1830 and 1846. It is bounded east by the Atlantic Ocean, Davis Strait, and Baffin Bay; north by the

Arctic Ocean; northwest by Alaska; west by the Pacific Ocean; and south by the United States. In its broadest sense British America includes Upper and Lower Canada, the Hudson Bay, and Northwestern territories, Nova Scotia, Newfoundland, Cape Breton, Prince Edward Island, and New Brunswick, with Vancouver Island in the Pacific, but all British possessions on or near the American continent. Each of these will be treated under its own title.

British Association for the Advancement of Science, a society first organized in 1831, mainly through the exertions of Sir David Brewster. Its first meeting was held at York, 27 Sept. 1831. Its objects are thus described in the preamble to the rules of the association: "To give a stronger impulse and a more systematic direction to scientific inquiry; to promote the intercourse of those who cultivate science in different parts of the British empire with one another and with foreign philosophers; to obtain a more general attention to the objects of science and a removal of any disadvantages of a public kind which impede its progress." The second meeting took place at Oxford in 1832, under the presidency of Dr. Buckland, and since then a meeting has been held every year up to the present. All the principal towns of the United Kingdom have on one or more occasions formed the place of rendezvous, a different locality being chosen every year. In 1884 the meeting took place at Montreal, in 1897 at Toronto, and in 1902, the 72d annual meeting was held in Belfast, Ireland. The meeting for 1903 will be held at Southport and that for 1904 at Cambridge. The sittings extend generally over about a week. The society is divided into sections, which, after the president's address, meet separately during the sittings for the reading of papers and conference. Sources, conversaciones, lectures, and other general meetings are usually held each evening during the meeting of the association. The sections are: A. Mathematics and Physics; B. Chemistry; C. Geology; D. Zoology; E. Geography; F. Economic Science and Statistics; G. Mechanical Science; H. Anthropology; I. Physiology; K. Botany; and L. Educational Science. Local committees are formed to arrange for meetings, etc. The important national benefits conferred by the labors of various members of the association have long been duly recognized. Among these may be mentioned more especially the experiments on electricity and magnetism which have achieved such important consequences in the establishment of the electric telegraph and a more thorough knowledge of the laws which govern the weather and other meteorological phenomena. In mechanical science also the labors of members of the British Association have been productive of the most important results. As the funds which the society collects at each meeting are more than sufficient to cover its expenses, it is enabled each year to make direct grants for the pursuit of particular scientific inquiries, which otherwise could not be conducted so efficiently, if at all; but besides this direct encouragement, its indirect influence on the promotion of science is undoubtedly great in many ways. Among the presidents of the association have been many distinguished men, including Dr. Whewell (1841), the Earl of Rosse (1843), Sir John Herschel (1845), Sir R. Murchison (1846), Sir

BRITISH CENTRAL AFRICA PROTECTORATE—BRITISH COLUMBIA

David Brewster (1850), Sir George Airy (1851), Sir Richard Owen (1858), Prince Consort (1859), Lord Armstrong (1863), Sir Charles Lyell (1864), Sir J. D. Hooker (1868), T. H. Huxley (1870), Lord Kelvin (1871), J. Tyndall (1874), Sir John Lubbock (1881), Lord Rayleigh (1884), Lord Playfair (1885), Sir William Huggins (1891), Sir A. Geikie (1892), and Sir W. Crookes (1898).

British Central Africa Protectorate, The, a portion of British Central Africa, lying around the shores of Lake Nyassa, and extending to the banks of the Zambezi. It includes all British Nyassaland, as well as the Shire Highlands, and the greater part of the basin of the river Shire. The expenses of administering the protectorate are partly met out of revenue locally raised, and further by an annual grant from the Imperial government. The administration is in the hands of a commissioner acting under the foreign office. The port of British Central Africa is Chinde, at the mouth of the Zambesi, where a small concession has been granted by the Portuguese government. The area of the Protectorate is about 40,000 square miles; the European inhabitants number about 500, and the native inhabitants are about 850,000. A number of forts, recently erected, guard the frontier in all directions, especially on the north and south-east, from the ingressions of the slave-trading Arabs and Yaos. The armed forces of the Protectorate consist of 200 Sikhs and 800 negroes. Most of the officers of this force are Indian officers lent, together with the Sikhs, by the Indian government. The principal occupation of the European settlers is planting; and many thriving plantations of coffee, sugar, cinchona, and tobacco have been established. The chief towns, Blantyre, Zomba, Fort Johnston (the principal port on Lake Nyassa, and naval depot), Karonga (north end of Lake Nyassa), the starting point for Tanganyika, and Kotakota (west coast of Lake Nyassa). The Protectorate is divided into 12 districts, managed by a number of collectors and assistant collectors, judicial officers, etc. There is at least one judicial officer, and in some cases two or three, in each district. Almost the entire trade of British Central Africa is with the United Kingdom. There is telegraphic connection through Umtali with the South African system.

Bibliography.—Scott Keltic, 'The Partition of Africa' (1895); Decle, 'Three Years in Savage Africa' (1897); Johnson, 'British Central Africa' (1897).

British Columbia, a province of the Dominion of Canada, is situated on the north-west coast of North America, between the 49th and 60th parallels of north latitude. The boundaries are: West, the Pacific Ocean and the frontiers of the United States Territory of Alaska; north, the parallel of 60°; east, the meridian of 120° W. from the northern boundary to Smoky River, and south of that the Rocky Mountains; south, the United States, separated from Columbia by the parallel of 49° north latitude. The water boundary-line between the colony and the United States, as settled by the arbitration of the emperor of Germany in 1872, runs through the Haro Channel, between Vancouver's Island and San Juan, leaving the latter island, the possession of which was disputed, to the United States. Thus the colony has along the

seaboard a length of 500 miles, and along its mountain frontier a length of 761 miles. Its breadth varies from 320 to 600 miles. Area about 383,000 square miles.

British Columbia is the most mountainous province of the dominion and presents much grand and picturesque scenery. In Mount Brown the Rocky Mountains attain the height of 16,000 feet. The Cascade or Coast Range runs parallel to the coast, and at a distance of 50 or 100 miles; between this range and the Rocky Mountains is an elevated valley, through which flows the Fraser River, the chief stream of the colony, receiving many affluents from the west, north, and northeast, and entering the Gulf of Georgia in lat. 49° 14'. This gulf is formed by Vancouver's Island, which here extends in front of the continent; and thus shelters the entrance to the Fraser River. About 15 miles above the mouth of the Fraser is the head of the delta formed by two branches. At this point, where the river is broad and deep, and the country becomes picturesque, stands New Westminster, at one time the capital. About 100 miles higher up the river eastward is Hope, where the stream, hitherto flowing to the south, turns to the west. About 16 miles higher up, at Yale, steamboat navigation ceases, owing to the numerous falls and the rapidity of the river, but a good road has been made to Lytton, at the fork of the Fraser and Thomson rivers, about 250 miles from the sea. The Canadian P. Ry after reaching the Thomson follows the course of this river and then that of the Fraser almost to the mouth of the latter, the terminus being at Vancouver. Numerous lakes, generally elongated from north to south between the several mountain ranges, aid with short portages to facilitate communication.

The climate of British Columbia is temperate and salubrious, and extremely favorable to vegetation. There is, however, a decided difference between the coast districts and the inland plateau, the extremes of temperature being much greater in the latter, and the rainfall very much less. The forest timber attains a colossal magnitude. Fish are extremely abundant in all the streams and on the coasts. The country may be described at present as generally inaccessible, owing to the mountains, forests, and rapid rivers; but great advances have been made in the construction of roads in recent years. There are many fertile districts in the colony, among which may be mentioned in particular the delta of the Fraser River. Wheat, barley, oats, and other cereals ripen readily and give an excellent return, and the grass of the country is admirably adapted for fattening cattle, and agriculture and stock-raising are advancing. Fruit grows in perfection. The colony contains valuable mineral deposits, the most important being gold and coal. The former was first found on the Fraser River in 1857. The Caribou diggings have been among the most productive. Coal is worked and exported, the chief mines being at Nanaimo in Vancouver's Island. Timber, fish, furs, and hides also form valuable articles of export, the canning of salmon being now an industry of importance.

British Columbia and Vancouver's Island were formerly distinct governments, but both now form one province, and were united to the Dominion of Canada in 1871. The capital is Victoria on Vancouver's Island. The popula-



BRITISH EMPIRE

Egypt, where the province is nominally part of Turkey, the official position of Lord Cromer is consul-general and minister plenipotentiary, and the title of Great Britain to possession is that of surviving partner of an international financial control.

In detail, the components of the empire, the dates and method of acquirement, and the title by which they are held, are as follows:

Europe.—1. The United Kingdom. England in its modern sense, though much restricted toward the north, first owned a common overlord in 827; broken up by the Danes, it became a wholly Danish kingdom in 1013, again an English one in 1042, part of an Anglo-French system in 1066, and was practically restored to itself in 1214, with its northern limits as now. Wales was finally subjugated by Edward I., after a long war with Llewellyn ap Iorwerth, in 1284. Scotland, a kingdom owning overlordship to England, received a king by English arbitration in 1291, revolted and was conquered, revolted again and won its independence in 1314; with the accession of its king, James I., to the English throne in 1603 the two crowns were united, and in 1707 the Scotch parliament was abolished and Scotland incorporated with England. The Isle of Man, a Scandinavian lordship, was ceded to Scotland in 1266 and to England in 1290. The Orkneys and Shetlands were pledged by Denmark to James III. of Scotland in 1468, as security for his wife's dowry, and never redeemed. Ireland was invaded by Strongbow in 1169, and nominally annexed to England by right of conquest in 1172; but only a small cattle of it, "the Pale," was effectively occupied till the time of Elizabeth, and the island as a whole was first effectively subjugated by Cromwell. It was governed by its own parliament till 1800, when the Act of Union incorporated it with Great Britain. 2. The Channel Islands (Guernsey, Jersey, etc.), in the bay of Avranches off the French coast, are the sole remnants of the French possessions of the Angevin house. 3. The fortress rock of Gibraltar, and the small plain at its foot on which the town is built, were taken from Spain in 1704, during the war of the Spanish succession. 4. Malta, with Gozo, etc., islands south of Sicily, were taken from France in 1800, during the Napoleonic wars. Malta is the chief British naval station in the central Mediterranean.

Asia.—1. India, with Burma. For the component parts of this mighty possession, three fifths the size of the United States without Alaska, and for its government, see its name. Its nuclei were three factories of the East India Company: Fort St. George, now Madras, built 1639; Bombay, received from Portugal in 1662 as part of the dowry of Catharine of Braganza, queen of Charles II.; and Fort William, now Calcutta, founded by Job Charnock in 1686. The attempt of the French to build a colonial dominion on the ruins of the Mogul empire, in the 18th century, forced the company's local officers to act in self-defense; with the result that north-eastern India fell into their hands, the decisive event being the battle of Plassey (1757). Wars, cessions, annexations, protectorates, residencies, etc., have gradually brought all the rest of the peninsula under English control. The company ceded its rights to the English government in 1858. 2. Ceylon, the tip of the Indian peninsula, is independently governed. It was taken by England from the Dutch in 1796, during the

French wars, but not ceded to her till the Peace of Amiens in 1802. 3. Cyprus, an island south of Asia Minor: was ceded by Turkey in 1878, as a result of the Russo-Turkish war, in return for a treaty by which Great Britain agreed to defend Turkey against further territorial demands from Russia. 4. Aden, on the south coast of Arabia: was taken by the British in 1839 as a coaling station, in compensation for the maltreatment of shipwrecked British sailors by the natives. The island of Socotra to the east, off the mainland of Africa, was annexed in 1888; and the two—with Perim Island at the mouth of the Gulf of Aden, and the Kuria-Murias on the east coast of Arabia—form one administration, a dependency of the Bombay presidency. 5. The Straits Settlements: This group, comprising the end of the Malacca peninsula, was transferred in 1867 from the control of the Indian government to that of the colonial secretary. It consists of (1) Penang, formerly called Pulo Penang and later Prince of Wales Island, originally received by a British adventurer as dowry with a native chief's daughter, then turned over to the East India Company in 1786; (2) Malacca, occupied by the British in 1795, but not formally ceded to them by the sultan of Johore till 1824, along with (3) the island of Singapore, the capital of the whole. Some of the native Malaccan states are also under British protection. 6. Hong Kong, China, was occupied by the British in 1841, as a result of the opium war, and ceded to them in 1843. 7. Labuan, an island off Borneo, of which Great Britain obtained the cession in 1846, with great hopes of its coal mines and harbor not borne out by experience; it has also been a convict settlement. 8. British North Borneo, ceded to a commercial company by native sultans in 1877, but taken under British protectorate in 1888. 9. Brunei and Sarawak, southwest of the above, are governed by native rulers, but under British protection.

Africa.—1. Sierra Leone, on the west coast: was started as a settlement of freed negro slaves in 1787; transferred to the Crown in 1807. 2. The Gold Coast: settlement of 1672 by the Royal African Company, made a dependency of Sierra Leone on the dissolution of that company in 1822, formally ceded by the Dutch in exchange for trade privileges in 1872, and made a Crown colony in 1874. 3. Gambia: settlement united with Sierra Leone in 1822, like the Gold Coast; made a separate colony 1843, reunited to Sierra Leone 1868, then included in the British West African Settlements colony till 1888, when it was again made a separate colony. 4. Lagos, West Africa: the town was an old slave mart destroyed by the British in 1851; the colony was ceded to them by the native rulers in 1861. 5. Nigeria: the Niger coast protectorate was constituted in 1884, old trading rights having been previously exercised for generations; the present protectorate of Nigeria was set up 1 Jan. 1901. 6. Cape Colony: taken possession of as a derelict in 1796, the settlement having thrown off Dutch rule; administered for seven years, then returned to the Dutch; again captured in 1806, Holland having become part of Napoleon's empire; retained till the general peace of 1815, then bought from Holland for \$30,000,000. 7. Natal and Zululand: taken from the Dutch settlers and annexed 1843. 8. Basutoland: annexed to Cape Colony 1871, as the result of an appeal by the Basutos from the claims

of the Orange Free State; separated as a special protectorate 1884. 9, 10. The Transvaal and the Orange River Colony: conquered 1900. 11. Zanzibar and Pemba. Pemba was ceded to the British East African Company in 1888 by the sultan of Zanzibar. The latter island was given over to a German protectorate in 1886 by an Anglo-German convention; in 1890 transferred to England in exchange for the island of Heligoland off the German coast, possessed by England and a thorn in the German flesh. 12. East Africa protectorate: recognized by Germany and France in 1890, with that of Zanzibar, for considerations as above and trading rights, and the recognition of the French protectorate over Madagascar. 13. Central Africa protectorate: organized 1891 from the territories of the British South Africa Company. 14. Bechuanaland, constituted a protectorate over native South African tribes in 1895. 15. Rhodesia: the territories of the Royal South Africa Company, chartered in 1889, were brought under the colonial office in 1898, with Matabeleland and Mashonaland. 16. British Somaliland, completing the circle around Africa up to Socotra and Aden; protectorate under the East India Company 1884, constituted a Crown colony 1898.

North America.—1. The Dominion of Canada is the chief. Its nucleus was the territory which fell under British sway by the French and Indian War 1755-60, definitely ceded in 1763. This was divided in 1791 into Upper Canada and Lower Canada, the latter as a real settlement founded by loyalist refugees from the United States, who also founded New Brunswick. England also held north of the United States: (1) Nova Scotia, conquered from the French in 1713, after a previous occupancy 1654-67; (2) Cape Breton, conquered 1748, and restored to France, conquered again in 1758 and ceded by France in 1763, when it was annexed to Nova Scotia; again separated 1784, again united 1820; (3) Prince Edward's Island, till 1799 called Isle St. Jean or St. John Island, then changed in honor of the Duke of Kent; captured from the French 1745, restored, again taken and held in 1758, ceded 1763 and annexed to Nova Scotia, in 1773 again separated. (4) Newfoundland, an old fishing station, ceded by France in 1713. In 1841 Upper and Lower Canada were united. In 1867 the united province was joined with Nova Scotia and New Brunswick into the Dominion of Canada. In 1871 this was joined by British Columbia, formed 1866 out of the older British Columbia and Vancouver Island, the former organized 1858 from the old Hudson Bay territory of New Caledonia; the latter a Hudson Bay territory made a Crown colony in 1849. In 1873 Prince Edward's Island also came into the dominion. Meantime, in 1869, it had acquired the Northwest Territories, and in 1870 set off Manitoba and at once admitted it into the dominion; Keewatin district was created in 1876; Assiniboia, Alberta, Saskatchewan, and Athabasca in 1882. 2 Newfoundland, which still refuses to join the dominion: its history is outlined above. Labrador forms a part of Newfoundland for administrative purposes. 3. The Bermuda Islands: settled 1609. 4. The Bahama Islands: ceded by Spain 1783, after alternate conquest and reconquest. 5, 6. The Windward Islands and the Leeward Islands: taken by the English in the general agreement with France for partitioning

the West Indies in 1660. 7. Jamaica, with Turk's Island and Caicos Island: taken from the Spaniards in 1655. 8. Barbados: colonized 1625, made a Crown colony in 1663. 9. Trinidad, with Tobago: captured in 1797 during the French wars. 10. British Honduras: settled early in the 18th century, but not ceded to Great Britain by treaty from Spain till 1783, formerly known as Balize or Belize. 11. British Guiana: partitioned off from the other Guianas in 1803, and formerly ceded by treaty in 1814.

South America.—The Falkland Islands, east of the southern tip of the continent: fought for by British, French, and Spanish for many years; then nominally controlled by Argentina till 1833, when the British took possession of them for a finality, and established a colony in 1851; it includes also South Georgia to the eastward.

The South Atlantic.—In the No-Man's Land between South America and Africa, and unrelated to either, the British hold three islands. 1. St. Helena: definitively secured from the Dutch by the East India Company in 1673, transferred to the home government in 1834. 2. Ascension: 700 miles northwest of St. Helena, settled in 1815 after Napoleon's deportation. 3. Tristan d'Acunha: a triad of little islands about half-way from the Cape of Good Hope to South America, garrisoned by the British in 1816 while Napoleon was at St. Helena.

Australasia.—1. The Confederation of Australia, formed 1901. The first colony in Australia was the convict settlement of New South Wales, made a self-governing colony in 1841. Western Australia was founded in 1829, South Australia in 1836. Victoria, settled in 1835 as Port Philip, was set off from New South Wales in 1851. Queensland was settled from Moreton Bay in 1825. Tasmania was a convict settlement of the island of Van Diemen's Land from 1803 on, but in 1852 the convict deportation there was stopped, and the colony made self-governing as Tasmania. 2. New Zealand was colonized in 1845. 3. The Fiji Islands came under British sway in 1874 by voluntary cession from Thakombau, the leader of the native chiefs. 4. British New Guinea was delimited and formally annexed in 1884. 5. There are a considerable number of islands in the western Pacific which have come into British hands at various periods, by occupation. The largest are: the Tongas, part of the New Hebrides and the Solomons, Ellice, Gilbert, Union, Cook, and Monahiki.

British Guiana, gē-ān'ā. See GUIANA.

British Gum. See DEXTINE.

British Honduras. See HONDURAS.

British India. See INDIA.

British Legion, The, a corps raised in Great Britain in 1835, numbering 10,000 men, under the command of Gen. De Lacy Evans, to assist Queen Isabella of Spain in the war with Don Carlos. They rendered much assistance to the queen, defeating her Carlist rivals in several battles, notably at Ayetta, during the two years of their campaign. Gen. Evans was himself defeated at Hernani in 1837, but subsequently captured that place and also several others. He acted in conjunction with a naval force under Lord John Hay.

British Museum, a national depository of science, literature, and art, which owes its origin to the will of Sir Hans Sloane, an eminent phy-

BRITISH NORTH AMERICA — BRITOMARTIS

sician and naturalist, who, dying in 1753, bequeathed to the nation his collection of medals and coins, antiquities, seals, cameos, drawings, and pictures, and his library, consisting of 50,000 volumes and manuscripts, on the condition of the payment of \$100,000 to his heirs. This offer was agreed to by Parliament, which authorized a lottery of \$500,000 to implement the bargain, as well as to purchase other collections. Montague House, which was bought for the purpose, was appropriated for the museum, which was first opened on 15 Jan. 1759. The original edifice having become inadequate, a new building was resolved on in 1823, the architect being Sir R. Smirke, whose building was not completed till 1847. It forms a hollow square, facing the cardinal points. The south, or Russell Street front, is the principal one, having an imposing columnar façade of the Ionic order. This, as well as the other three, looks into the central square court, which measures about 320 feet by 240. There are two stories of galleries and rooms round the greater part of the building. Smirke's designs were no sooner completed than it was found that additional accommodation was needed in various departments, and several new rooms were provided; but the library accommodation being wholly inadequate for the accommodation of the readers, as well as for the reception of new books, a grant was obtained from Parliament for a new library building in 1854, and it was completed and opened in 1857, at a cost of \$750,000. It was erected in the interior quadrangle, and contains a circular reading-room 140 feet in diameter, with a dome 106 feet high. The whole arrangements have been completed with the utmost economy in regard to space, and besides ample accommodation for books, the reading-room now contains accommodation for 300 readers comfortably seated at separate desks, which are provided with all necessary conveniences. More recently, the accommodation having become again inadequate, it was resolved to separate the objects belonging to the natural history department from the rest, and to lodge them in a building by themselves. Accordingly a large natural history museum has been erected at South Kensington, and the specimens pertaining to natural history (including geology and mineralogy) have been transferred thither, but they still form part of the British Museum. Externally this building is somewhat heavy in character, but the interior has been treated in a most artistic manner. The British Museum is under the management of 48 trustees, among the chief being the Archbishop of Canterbury, the lord-chancellor, and the speaker of the House of Commons. In all the staff of the institution numbers over 320 persons. The museum is open daily, free of charge. Admission to the reading-room as a regular reader is by ticket, procurable on application to the chief librarian, there being certain simple conditions attached. In 1900 there were 198,566 persons using the reading-room, and 689,249 visitors in addition. The institution contains something like 2,000,000 volumes in the department of printed books. A copy of every book, pamphlet, newspaper, piece of music, etc., published anywhere in British territory, must be conveyed free of charge to the British Museum. There are various catalogues and handbooks prepared by the officers of the museum, and containing classified descriptions of the con-

tents of the different departments. Of these there are eight, namely, the department of (1) printed books, maps, charts, plans, etc.; (2) of manuscripts; (3) of natural history; (4) of Oriental antiquities; (5) of Greek and Roman antiquities; (6) of coins and medals; (7) of British and mediæval antiquities and ethnography; (8) of prints and drawings.

British North America, the Dominion of Canada and the island of Newfoundland, with the portion of Labrador belonging to the latter. The Bermudas may also be included.

British Somaliland, a territory on the west coast of Africa under the protection of Great Britain, lying along the Gulf of Aden from about lon. 43° to 49° E., and extending from about lat. 11° to 8° N. On the east and south-east it is bounded by Italian Somaliland, on the south and west by Abyssinia, and on the north-west by French Somaliland. It has an area estimated at nearly 70,000 square miles, lacking in fertility largely on account of a lack of natural irrigation. The surface is in great part mountainous. The climate is more healthful in the interior than along the coast where there is more dampness. Among the chief products are sheep, cattle, skins, ostrich feathers, myrrh, and incense. The principal ports are Bulhor, Zeyla, and Berbera. The latter, which is the capital, has a good harbor and is in winter the scene of considerable commercial activity. The combined imports and exports are valued at about \$2,500,000. The protectorate, created in 1884, is administered by a consul-general under control of the Crown. In 1894 the boundary between this protectorate and Italian Somaliland was defined. In the spring of 1903 an agitation in this region in favor of the Mad Mullah (q.v.), led to a considerable loss among the British troops and their withdrawal in April. The inhabitants are related to the Abyssinians and Gallas, and on account of their nomadic habits there are no accurate statistics of population. See Peel, 'Somaliland' (1899); Swayne, 'Seventeen Trips Through Somaliland' (1900); Hendeber, 'Au pays des Somalis et des Comoriens' (1901).

British South Africa Company, a corporation established in 1889, with a royal charter, by Cecil Rhodes and others, for the purpose of controlling, settling, administering and opening up by railways and telegraphs, etc., certain districts in Central South Africa. Mashonaland was first settled, and, in 1893, Matabeleland was annexed and settled after the defeat of King Lobengula. In 1895, North Zambesia, in British Central Africa, was added, as well as a strip of territory in the Bechuanaland Protectorate. This territory has been called Rhodesia, or British Zambesia; area, about 500,000 square miles. In consequence of the filibustering raid of Dr. Jameson, an officer of the company, near the close of 1895, Rhodes resigned his connection with the company in 1896, and a joint administrator of the territory was appointed by the British crown. See RHODESIA.

British West Indies. See WEST INDIES.

Britomartis, a nymph of Cretan mythology, fabled to have been raised by Artemis into a deity, on the occasion of drowning herself to escape from the pursuit of Minos. She was presented as patroness of hunters and fishermen.

BRITTANY — BRIVES-LA-GAILLARDE

The name was chosen by Spenser to represent in the 'Faerie Queene' the personification of chastity, and thus contained an allusion to the Virgin Queen, Elizabeth.

Brit'tany, or **Bretagne**, formerly one of the largest provinces of France, being a peninsula washed by the Atlantic on all sides except the east, where it joined Poitou, Anjou, Maine, and Normandy. It now forms five departments, Finistère, Côtes-du-Nord, Morbihan, Ille-et-Vilaine, Loire-Inférieure, containing, in 1896, 3,175,961 inhabitants on 13,130 square miles. It is supposed to have received its name from those Britons who were expelled from England and took refuge here at various periods between the 5th and 7th century. Before that time it bore the name of Armorica. It formed one of the duchies of France, and was held by sovereigns nearly independent and often at war with the French monarchs till it was united to the crown by the marriage of Louis XII. with Anne of Brittany, the widow of Charles VIII., in 1499. It was given by Louis XII. to Claude, Countess of Angoulême, who married Francis I., and was reunited to the crown in 1532. The province was divided into Upper and Lower Brittany. Agriculture in this territory is very backward, and it is estimated that about one half of the surface lies waste. Corn and wine are produced in small quantities. Flax and hemp, apples, and pears are abundant and of good quality. Cider is the principal drink. Salt is made on the coast, and coal, lead, and iron are found in various parts. There are manufactures of hemp, flax, and iron. The fisheries also employ many of the inhabitants. The people of Brittany still retain their ancient language, which is closely allied to Welsh, and is exclusively used by the peasantry in the western part of the province. Many Celtic remains are found throughout the country.

Brittle Star, also called **Snake Star**, and **Sand Star**, a member of the order of *Ophiurida*, class *Asteroidea*, of the phylum *Echinodermata* (q.v.). It is characterized by the body forming a flattened disk, with cylindrical arms, the stomach not extending into the arms, and there is no intestine or anal opening. The ambulacral furrow is covered by the ventral shields of the tegument, so that the ambulacral feet project from the sides of the arm. It moves faster than the true star-fish, the arms being more slender and flexible. An ophiuran which has accidentally lost an arm can reproduce it by budding. In species of *Ophiothela* and *Ophiactis* the body divides in two spontaneously, having three arms on one side and three on the other, while the disk looks as if it had been cut in two by a knife, and three new arms had then grown out from the cut side.

The ophiurans in most cases undergo a decided metamorphosis like that of the star-fish. The larva, called a "pluteus," is free-swimming, though in some species the young, in a modified larval condition, reside in a pouch situated above the mouth of the parent, finally escaping and swimming freely about.

Our most common brittle star is *Ophiopholis aculeata*, which may be found at low-water mark, and especially among the roots of *Laminaria* thrown upon the beach. It is variable in color, but beautifully spotted with pale and brown, its

general hue being a brick-red. Ophiurans are widely distributed, and live at depths between low-water mark and 2,000 fathoms. Fossil ophiurans do not occur in formations older than the Upper Silurian, where they are represented by the genera *Protaster*, *Palæodiscus*, *Acrourea*, and *Eucladia*; genuine forms closely like those now living appear in the muschelkalk beds of Europe (Middle Trias).

Brit'ton, John, English archæologist: b. 7 July 1771; d. London, 1 Jan. 1857. In 1787 he came to London, and was employed for six years as cellarman in the Jerusalem Tavern, Clerkenwell, and afterward served in the same capacity in the London Tavern. He next entered the employment of a hop merchant in Southwark, and then an attorney's office in Gray's Inn. During all this period he had sedulously cultivated his taste for reading during his leisure hours, and took part in the proceedings of several debating societies. In 1799 he accepted an engagement from a Mr. Chapman to write, sing, and recite for him at a theatre in Pantion Street, Haymarket, at a salary of three guineas per week. From this period his literary career may be said to have commenced, developing itself at first in the form of pamphlets, song-books, and similar minor subjects. He soon advanced, however, to a higher grade, and in 1801 appeared the first two volumes of the 'Beauties of Wiltshire,' by J. Britton and E. W. Brayley. These collaborators, with others, subsequently completed a similar work for all the other counties of England (1801-16, 18 vols.; 1825, 26 vols.). In 1805-14 Britton published his 'Architectural Antiquities of Great Britain' in four volumes, supplemented in 1818-26 by another entitled 'Chronological History and Graphic Illustrations of Christian Architecture in England.' These were followed by his 'Cathedral Antiquities,' in 14 volumes (1814-35); and the 'Dictionary of the Architecture and Archæology of the Middle Ages' (1832-8).

Britton, Nathaniel Lord, American scientist: b. New Dorp, Staten Island, N. Y., 15 Jan. 1859. He was professor of botany in Columbia School of Mines in 1888-96, and later director of the New York Botanical Garden. He has written 'Geology of Staten Island' (1880); 'Catalogue of the Flora of New Jersey' (1882); and collaborated in preparing 'An Illustrated Flora of the Northern United States, Canada.'

Brit'zka, a Russian traveling carriage, the head of which is always a movable calash, having a place in front for the driver, and a seat behind for servants. The body is so arranged that the traveler can sleep therein at night.

Brives-la-Gaillarde, brev-la-yârd (ancient BRIVA CURRETIA), a town in France, department of Corrèze, situated amidst vineyards and orchards, on left bank of the Corrèze, surrounded by a fine avenue of elms. The houses are substantially built of stone, but the streets are narrow, and the public squares indifferent. It contains a church of St. Martin dating from the 12th century, some ancient houses in the Gothic style, and a library. Its industries include the manufacture of leather, cotton goods, pottery, wax candles, etc., and it also carries on an active trade in truffles, wool, wine, and nuts. Pop. (1896) 18,111.

BRIXHAM—BROAD SEAL WAR

Brix'ham, an English town in Devonshire, situated on the English Channel, 23 miles south of Exeter. It covers the sides of two hills, and is divided into Upper and Lower Brixham. The parish church is a large ancient structure, in the Perpendicular style. The trade of Brixham is chiefly in fish, and is of considerable extent, London, Bath, and Bristol receiving supplies from this place. The port possesses also a number of vessels engaged in the coasting and foreign trade; those in the latter plying chiefly to the Mediterranean. Ship-building and the manufacture of sails, ropes, paint, etc., are among the other industries. Brixham is celebrated in history as the place where the Prince of Orange, afterward William III., landed, 4 Nov. 1688. In 1858 a cave was discovered on Windmill Hill, containing the bones of extinct mammals, some flint implements, etc. Pop. (1901) 8,090.

Bri'za, a genus of grasses, commonly called quaking-grass, maiden's-hair, or lady's-tresses. There are about 30 species, chiefly found in South America. *B. media* is a native of the United States, and is found occasionally in pastures in the eastern States.

Broach, or **Baroach**, India, a seaport town in Guzerat, Bombay, situated on the Nerbudda, about 30 miles from its mouth. The river here is crossed by a railway bridge, and for about a mile in front of the town is lined with a massive stone wall. Broach is surrounded with ruinous walls, and has narrow streets, with houses mostly of two stories and built of brick. There are no buildings of interest. It is an ancient place, and one of the oldest seaports of western India, and was formerly famous for its cotton manufactures. The town was taken by storm by the British in 1772, and, with the district, ceded to them by treaty with Scindiah in 1803. Formerly it had a great export of cotton, and it still carries on a trade in cotton, grain, and seeds with Bombay and Surat. Pop. (1901) 42,300 (including many Parsees). The district of Broach lies on the east side of the Gulf of Cambay. Broach cotton holds the highest place in the Bombay market. Area, 1,453 square miles; pop. about 350,000.

Broad Arrow, a government mark placed on British stores, guns, etc., to distinguish them as public or Crown property. It was the cognizance of Henry, Viscount Sydney, Earl of Romney, master-general of the ordnance, 1693-1702, and was at first placed only on military stores. Persons in possession of goods marked with the broad arrow forfeit the goods and are subject to a penalty, and it is made felony by statute to obliterate or deface it. The mark is also used in the Ordnance Survey maps to denote points from which measurements have been made.



Broad Arrow.

Broad Church, a name given originally to a party in the Church of England, regarded as being midway between the Low Church or Evangelical section and the High Church or Ritualistic; now widely applied to the more tolerant and liberal section of any denomination.

Broad-headed Snake. See DEATH-ADDER.

Broad Mountain, an elevation in the anthracite coal region of Pennsylvania; a plateau of conglomerate rock, about three miles wide and 2,000 feet above the sea, undulating just enough to contain three shallow coal-basins intermediate between the Pottsville and Mine Hill on the south, and the Mahoning and Shamokin coal-fields on the north.

Broad Piece, a term applied to some English gold pieces broader than a guinea, particularly Caroluses and Jacobuses.

Broad River, a stream of North and South Carolina, rising at the foot of the Blue Ridge, in the western part of the former State, and entering York district in South Carolina. It then takes a southerly course through a rich and highly productive tract of country covered with fields of maize and cotton, and finally unites with the Saluda to form the Congaree River. The city of Columbia is at their junction. The river is about 225 miles in length, and is navigable for shallow-draft boats for upward of 140 miles.

Broad Seal War, 1838-9, a disputed-election case in New Jersey and in Congress; turning in New Jersey on the power of a county official, in collusion with the State executive, to nullify the result of a State vote; in Congress on the right of the clerk to base official action on information not before Congress. New Jersey then elected her six congressmen on general ticket, and in 1838 that of the Democrats carried the State by an average of about 100; but the Whig county clerk of Middlesex County threw out the vote of South Amboy, with 252 Democratic majority, for lack of the election-clerk's signature, and for other irregularities, giving the Whigs five of the six seats. The Democrats claimed that such technicalities had been repeatedly waived, and were counter-vailed by like ones in Whig towns; and, even so, that by law the governor and council, as a canvassing board, must send at once for any missing return and pass on its validity. Those officials were Whigs, however, and they decided that they could not go behind the clerk's certificate, and issued credentials to the Whig candidates under the "broad seal" of the State. This would have made only the usual party broil, but that the national House stood 119 Democrats to 118 Whigs without the New Jersey members, so that the decision carried with it control of the organization of Congress. The Democratic clerk of the House, H. A. Garland, of Virginia, on its meeting 2 Dec. 1839, omitted the New Jersey members in his roll-call, on the ostensible ground that their seats were to be contested and he must leave the decision to Congress; really because excluding them gave his party the speaker and the committees, and incidentally secured himself the clerkship however the contest was decided. This was utterly illegal, as there could be no contest till a congress was organized to bring a contest before; but he doubtless felt it as legitimate as the trick by which the Whig members were sent there, and that party could hardly complain of unfairness. For three days there was helpless rage and anarchy in the House, the clerk refusing to put the question upon any of the motions to bring order out of the chaos. Finally on the 5th the leaders of both parties called in John Quincy Adams (q.v.), the one member who had

BROAD-TOP MOUNTAIN — BROADWAY

no party or affiliations of any sort, and who was respected as at once immutably just, unshrinkingly courageous, and of the highest parliamentary knowledge. He called upon the meeting to organize itself, offered a resolution ordering the clerk to call the names of the New Jersey members with credentials, and on the clerk's refusal announced that he would put the question himself. He was at once elected speaker *pro tem.*, and for six days more the fight went on to choose a permanent speaker, with both New Jersey delegations voting. On the 11th a motion was carried that neither delegation had a right to vote till the contest was decided; on the 16th a compromise was made by which R. M. T. Hunter, of Virginia, a Whig who favored the Democratic sub-treasury scheme, was chosen speaker. On 10 March 1840 the Democratic contestants were seated; on 16 July the majority report of the committee on the case, declaring them duly elected, was accepted by a vote in which all but 22 Whigs refused to take part, on the ground that the report and testimony were too long to examine. The political prize at stake had caused the parties to exchange principles, as they did earlier on the Louisiana Purchase and later on the Electoral Commission: the Democrats, though strict-constructionists, disregarded State certificates and insisted on going behind the returns; the Whigs, though upholding equity against forms, clung to the sanctity of a State certificate however obtained.

Broad-top Mountain, a trapezoidal plateau of semi-bituminous coal measures, in Huntingdon and Bedford counties, Pennsylvania. The highest point is about 2,600 feet above the sea. It is surrounded by a red shale valley, and an outside ring of Devonian rocks, called Terrace, Harmer, and Sidelong mountains. Through gaps in this ring flows the Raystown branch of the Juniata. The mountain contains two principal coal basins. It contains in its deepest troughs about 900 feet of coal measures, and takes in the Pittsburgh coal bed, with one of the limestones above it. Coal was mined here for blacksmithing nearly 100 years ago. The coal is a semi-bituminous steam coal, containing from 12 to 18 per cent of volatile matter, and of the same qualities as Cumberland coal.

Broad'bent, Sir William Henry, English physician: b. Yorkshire, 23 Jan. 1835. He was educated at the Royal School of Medicine in Manchester and at Paris. He was at first appointed physician to the Western General Dispensary; then physician to the London Fever Hospital and the Saint Mary's Hospital successively. He was physician extraordinary to Queen Victoria, 1898-1901; and in the latter year was appointed physician-in-ordinary to King Edward VII. He is a member of the Medical Society of London and was censor of the Royal College of Physicians, 1888-9, and 1895-6. He has written 'The Pulse' and 'The Heart.'

Broad'casting, a mode of sowing grain by which the seed is cast or dispersed upon the ground with the hand, or with a machine devised for sowing in this manner; opposed to planting in drills or rows.

Broad'head, Garland Carr, American geologist: b. Albemarle County, Va., 30 Oct. 1827. He studied at the University of Missouri and

was long the State expert in geology. He was professor of geology at the University of Missouri, 1887-97, and he is considered an authority on the Missouri coal measures. His writings include 'Geological Survey of Missouri Iron Ores and Coal Fields'; 'Geological Survey of Missouri'; and 'Illinois Geological Survey Report.'

Broad'hurst, Henry, English politician and labor organizer: b. Oxfordshire, 13 April 1840. As a boy he worked in a blacksmith's shop; then as a stone mason till 1872. He has been prominent in the labor movement; in 1875 he was secretary of the Labor Representative League and of the parliamentary committee of the Trades Union Congress. He has been a member of Parliament for Stoke-upon-Trent, 1880-5; for Bordesley, 1885-6; for Nottingham, 1886-92. He was under-secretary in the Home Department in 1886, and has served on several royal commissions for the investigation of the condition of the laboring class. He wrote 'Handy Book on Leasehold Enfranchisement' (with Sir R. T. Reid).

Broad'mouth, or **Broad'bill**, one of about a dozen species of small lethargic, songless birds of the family *Eurylamidae*, having a notable breadth of beak. Flocks of these birds are distributed through the woods from the Himalayas to the Philippines. The broadmouths are brilliant in plumage, and mainly fruit-eaters, with the exception of two species of the genus *Calyptomena*, which are insectivorous.

Broads, The Norfolk, England, a series of lakes, usually said to be formed by the widening or broadening out of the rivers. The broads *par excellence* are those of the Bure or North River (which empties into the sea at Yarmouth), and its tributaries, the Ant and the Thurne. The broads have grown greatly in favor with holiday-makers in recent years.

Broad'side, in a naval engagement, the whole discharge of the artillery on one side of a ship of war, above and below. The fighting power of a ship was formerly estimated by the weight of her broadside. The term is also applied to any large page printed on one side of a sheet of paper, and, strictly, not divided into columns. In this sense it is sometimes called a broadsheet.

Broad'stairs, England, a watering-place in the Isle of Thanet, Kent, two miles northeast of Ramsgate. It is said that the name is derived from the width of the passage leading down to the sea. Pop. (1901) 6,460.

Broad'sword, a sword with a broad blade, designed chiefly for cutting, formerly used by some regiments of cavalry and Highland infantry in the British service. The claymore or broadsword was formerly the national weapon of the Highlanders.

Broad'way, the chief thoroughfare, and the principal business street of New York. Starting from Bowling Green at the lower extremity of the island, it runs nearly due north to 14th Street, whence it takes a westerly diagonal course to 78th Street, at which point it again runs due north to 103d Street. Taking the westerly trend again to 108th Street, it thence runs north again, and, following the course of the old post road, is continued under the name of Broadway as far as Albany. Its continuous

BROADWOOD — BROCHS

course is interrupted by two public squares; Union Square at 14th Street, and Madison Square at 23d Street. Below Madison Square it is devoted mainly to office buildings and wholesale establishments. Above Madison Square (where it intersects Fifth Avenue and 23d Street) are theatres and the chief hotels. Its length below 59th Street is about five miles, and is traversed by an electric railway. A portion of the subway is excavated under the part of Broadway which is above 42d Street, and also that part below Park Place.

Broad'wood, John, English pianoforte manufacturer; b. Cockburnspath, Scotland, 1732; d. 1812. Going to London, he entered into partnership with a Swiss maker of harpsichords, named Burkhardt Tschudi, the firm being known as Tschudi & Broadwood. In 1769 his partner retired, and on his death four years later his son became a partner with Broadwood; but from 1783 till 1795, when Broadwood's son entered into partnership with him, he had the sole control of the business. The firm has long been known as John Broadwood & Sons. By the skill of Broadwood and those associated with him many improvements were introduced in the construction of the pianoforte, and for a long time the history of the firm was practically the story of the progressive development of that instrument.

Brobdignag, an imaginary country described by Dean Swift in 'Gulliver's Travels.' The inhabitants are represented as being of enormous size and the details of their environment in proportion; whence has arisen the adjective "brobdignagian."

Broca, Pierre Paul, pē-ār pōl brō-kā, French surgeon and anthropologist; b. Sainte-Foy-la-Grande, department of the Gironde, 28 June 1824; d. Paris, 9 July 1880. In 1841 he began the study of medicine at Paris, became hospital surgeon in 1844, anatomical assistant in the Faculty of Medicine in 1846, preparator in anatomy in 1848, and professor in 1867. Between 1861 and 1865 he carried out his famous researches on the localization of cerebral functions. He gained great distinction in anthropology, and in 1859 founded the Paris anthropological society. During the Franco-German war he engaged in hospital work at La Pitié, but when peace was concluded he resumed his teaching. In 1872 he founded the 'Revue d'Anthropologie,' and four years later he established the Ecole d'Anthropologie, which formed the nucleus of the later Institut Anthropologique. His writings are numerous and important.

Brocade', a fabric having a pattern of raised figures; often a stuff of silk, enriched with a raised pattern of flowers, foliage, and other ornaments. Formerly it signified a stuff woven all of gold or silver threads, or in which silk was mixed with such threads; at present all stuffs are so called if they are worked with raised flowers or other figures, and especially when the figures are in more than one color. Brocade is in silk what damask is in wool. Brocatelle, in which cotton and wool are used instead of silk, is an imitation of brocade.

Brocatelle'. See BROCADE.

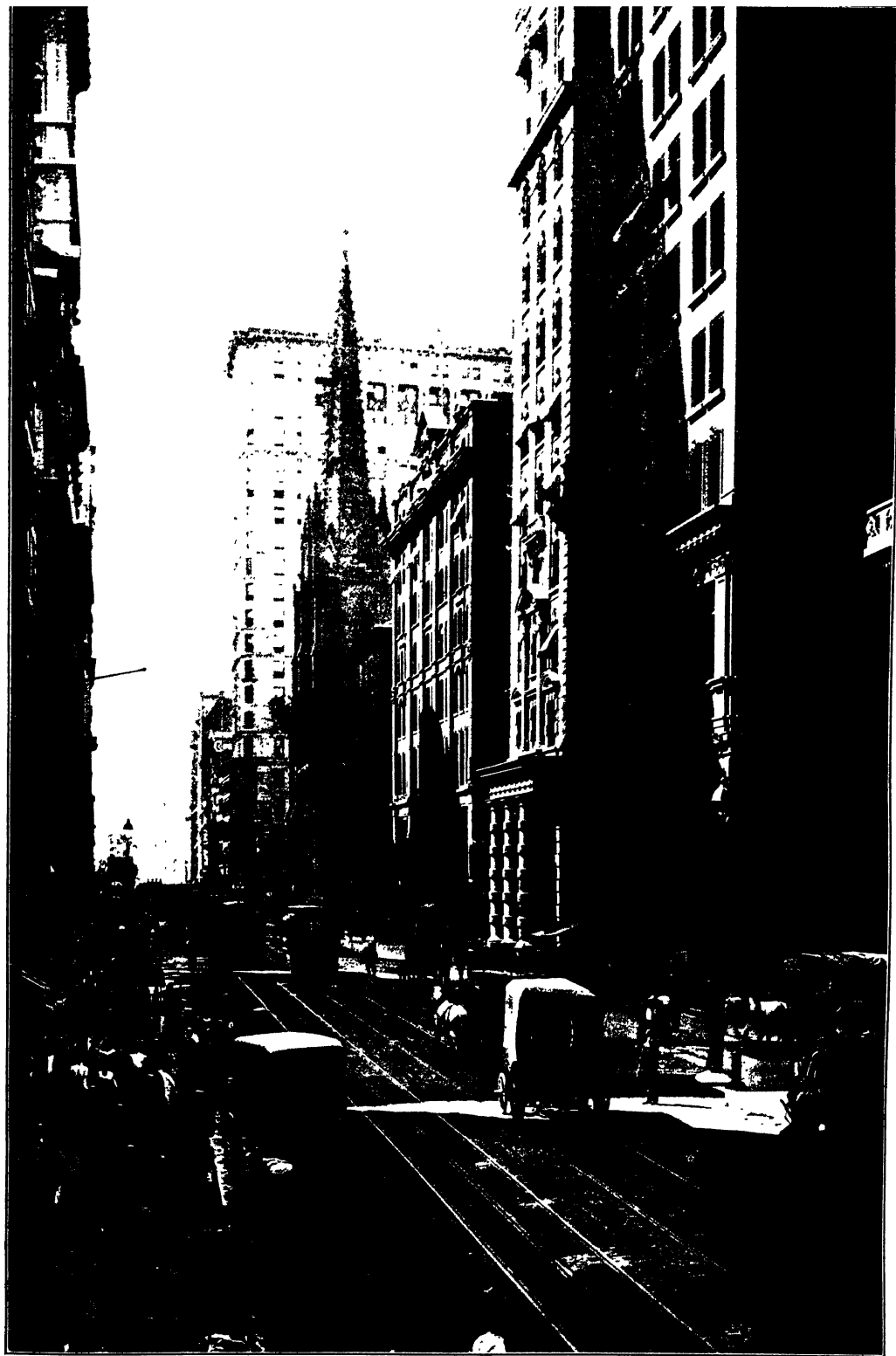
Brocchi, Giovanni Battista, jō-vān'nē băt-tēs'tā brōk'kē, Italian mineralogist and geologist; b. Bassano, 18 Feb. 1772; d. Khartum,

25 Sept. 1826. In 1808 his valuable researches upon iron mines and metalliferous mountains procured him the office of inspector of mines in the newly established kingdom of Italy. In 1814 he published a work on the structure of the Apennine range, with an account of the fossils of its strata. He corrected the erroneous view of Brieslak, who supposed Rome to occupy the site of an extinct volcano, to which he ascribed the tufa and other volcanic materials found on the seven hills. Brocchi, on the other hand, satisfactorily showed that they are derived either from Mont Albano or Monte Cimino. Both of these are extinct volcanoes, the first 12 miles, the other still farther, to the north of the city. In 1823 Brocchi sailed for Egypt with the view of exploring the mineral resources of that country. He received a commission from Mehemet Ali to examine his recent conquest of Sennaar, but the climate proved too much for his constitution.

Broc'coli, a variety of the cauliflower, harder and with more color in the flower and leaves. The chief varieties are green, purple, and dwarf broccoli. It is inferior in flavor to cauliflower, but serves as a substitute for it when the latter cannot be obtained. See CAULIFLOWER.

Brochantite, brō'shōn-tit (from BROCHANT DE VILLIERS, a French mineralogist), an orthorhombic transparent or translucent mineral, with hardness 3.5-4; specific gravity, 3.78-3.90; lustre vitreous, pearly on one cleavage face. Composition: Sulphuric acid, 15.8-19.71; oxide of copper, 62.626-69.1; oxide of zinc, 0-8.181; oxide of lead, 1.03-1.05. It is found in all portions of the world. It can be produced artificially. Dana makes two varieties—(1) Ordinary brochantite. (2) Warringtonite, with which bronznartine may be classified.

Brochs, brōchs, class of edifices peculiar to Scotland, particularly in the northern counties, including Orkney, Shetland, and the Western Isles, more than 300 in all being known. A broch is a hollow circular tower of dry-built masonry, rarely more than 70 or less than 40 feet in total diameter, occasionally at least 50 feet high, and enclosing a circular court or area from 25 to 45 feet in diameter. The wall, which may be from 9 to 20 feet thick, is carried up solid for about 10 feet, except where pierced by the narrow passage giving entrance to the interior court, or where chambers are hollowed within its thickness and opening off the court. Above this height there are horizontal galleries in the wall, each about 6 feet high and 3 feet wide, running completely round the tower, except where crossed by the stair giving access to them, and having windows placed above each other, and all looking into the central area. The only external opening is a doorway about 5 or 6 feet high, and rarely more than 3 feet wide. The passage varies from 9 to 18 feet in length, and about 4 feet from its outer entrance is the door. Many of the brochs are found in naturally strong positions, such as a precipitous eminence or a promontory projecting into a loch, and further defenses are afforded by ditches and embankments, earthen ramparts, and dry stone walls. Hence it is clear that they were intended to serve as places of shelter and defense, for which purpose they are admirably contrived, as they form a series of



LOOKING DOWN LOWER BROADWAY, NEW YORK.

BROCK — BROCKHAUS

strongholds that could be reduced only by a regular siege, the inmates being safe against missiles and even against fire, from the height and strength of the walls. Provided with a sufficiency of food, and obtaining water from a well inside the enclosure, the people thus sheltered could hold out for an indefinite time. The relics found in the brochs, like the structures themselves, are Celtic in character, and belong to post-Roman times. The Brochs were probably built as places of refuge from the Scandinavian vikings that for centuries were a scourge to many of the European coasts, but little or nothing of their history is known. The relics include swords, spears, knives, axes, and chisels of iron, with rings, bracelets, pins, and other articles of bronze or of brass. Numerous articles made of bone and horn are also found, with stone implements, as querns, mortars, pestles, bowls and cups, lamps, etc. Pottery of various kinds is also found. Spinning and weaving were evidently practised by the broch-builders. Agriculture, hunting, and fishing furnished subsistence; and animal food was furnished by the stag, roe, reindeer, ox, sheep, goat, and pig, as well as by the whale, porpoise, cod, haddock, and other denizens of the sea.

Brock, Sir Isaac, English soldier: b. Guernsey, 6 Oct. 1769; d. Queenston, Canada, 13 Oct. 1812. He was educated at Southampton and Rotterdam, and entered the army as ensign in the 8th Regiment in 1785. In 1791 he transferred to the 49th Infantry, and saw service in the West Indies. In 1802 he went to Canada at the head of that regiment, returning three years afterward; but in 1806 he was again in North America. He became major-general in 1811, and in the following year compelled the surrender of the American general Hall at Detroit. For this service he received knighthood in the Order of the Bath, but he did not live long to enjoy the honor; for during an attack on Queenston by another American force, only three days after he was knighted, he was mortally wounded. The sum of £1,575 was voted by the House of Commons for a monument to Brock, which now stands in the south transept of St. Paul's Cathedral, London. There is another monument to him at Queenston, erected at public cost in 1842.

Brock, Thomas, English sculptor: b. 1847. He studied with J. H. Foley and finished after the latter's death a number of his works. Among his productions is the Longfellow bust in Westminster Abbey. He is a member of the Royal Academy.

Brockedon, bröck'dën, **William**, English artist and inventor: b. Devonshire, 1787; d. London, 1854. He was the discoverer of a method by which plumbago and its dust (previously thrown away as valueless) could be freed from impurities and re-solidified, so as to make a superior description of lead pencils, of various degrees of hardness, well adapted for artists' use. Mr. Brockedon was a painter, and author of 'The Passes of the Alps,' with over 100 folio engravings from drawings by himself. He also produced 'Italy, Classical and Picturesque' (1842-3); and 'Egypt and Nubia' (3 vols. 1846-9).

Brock'en, a mountain in Germany, popularly known as Blocksberg, the highest summit

of the Harz Mountains (about 3,745 feet), in the Prussian government of Magdeburg. It was known to the Romans as Mons Bructerus. The bare, treeless summit is covered with snow from November to June; and on it are a hotel and an observatory. Under certain atmospheric conditions the visitor may see a gigantic figure of himself reflected on the clouds (the "Spectre of the Brocken"). According to a popular legend the German witches used to assemble here on Walpurgis Night (q.v.) for an annual orgy. Two driving-roads and a railway lead up the mountain. Many tourists visit the Brocken during the summer, and in clear weather an extensive view may be obtained.

Brocket (Fr. *broche*, a "spit" or "tine"), a book-name given to Brazilian deer of the sub-genus *Coassus*, because of their spike-like antlers. There are three species, varying in height from 19 to 27 inches, namely: (1) Guazuviva (*Coassus nemorivagus*), or Brazilian deer; (2) Pita (*Coassus rufus*); (3) A similar form, the pudu (*Pudua humilis*) of the Chilean Andes, the smallest of all deer, having spike horns only about two inches long.

Brockett, Linus Pierpont, American author: b. Canton, Conn., 16 Oct. 1820; d. Brooklyn, 13 Jan. 1893. He graduated at the Yale Medical School in 1843, and practised medicine for a few years. Later he devoted himself to editorial and other literary work. He wrote a 'History of Education'; 'Men of Our Day'; 'The Year of Battles'; 'Epidemic and Contagious Diseases'; 'The Great Metropolis'; etc.

Brockhaus, Friedrich Arnold, frëd'rîn är'nöld bröck'hows, German publisher, founder of the publishing firm of Brockhaus in Leipsic: b. Dortmund, 4 May 1772; d. Leipsic, 20 Aug. 1823. He was educated at the gymnasium of his native town, and in 1793 went to Leipsic, where he devoted two years to the acquisition of scientific knowledge and the principal modern languages of Europe. In 1795 he established at Dortmund a mercantile house for the sale of English manufactures, which he removed to Arnheim, in the Netherlands, in 1801, and to Amsterdam in 1802. Although he managed his business with success, he abandoned it out of distaste for mercantile pursuits in 1804, and entered into the book trade at Amsterdam. After the annexation of Holland to the French empire (1810), Brockhaus returned to Germany, and re-opened his establishment in Altenburg (1811). In 1813 the firm received the title of F. A. Brockhaus. In 1808 Brockhaus had purchased the copyright of the German 'Conversations-Lexikon,' which had been begun in 1796. In 1809-10 he completed the first edition by the publication of two supplementary volumes. In 1812 he began to publish the second edition of this work, which was finished under his own editorship. It was favorably received and had an extensive sale. The business now rapidly extended, and was removed to Leipsic in 1817. It still is carried on by the grandsons of the founder, and there are now chief branches in Berlin and Vienna. Among the literary undertakings of the house have been several important critical periodicals and some large historical and bibliographical works. The 'Conversations-Lexikon,' distinctively associated with the name of Brockhaus, has now reached a 14th edition.

BROCKHAUS — BRODIE

Brockhaus, Hermann, German Orientalist: b. Amsterdam, 28 Jan. 1806; d. Leipsic, 5 Jan. 1877. He was educated at Amsterdam and at Göttingen and Bonn, where he devoted himself to Oriental languages. He lived for a long time in France and England and then settled in Dresden. In 1839 he went as professor to Jena, and in 1841 to Leipsic, where he became professor of Sanskrit, a position he held until his death. He published many works on Oriental literature, and edited the great 'Allgemeine Encyklopädie' of Ersch and Gruber.

Brockton, Mass., a city in Plymouth County, situated on the N. Y., N. H. & H. R.R.; 20 miles south of Boston. It is one of the largest boot- and shoe-manufacturing places in the country, and beside these articles has extensive manufactories of rubber goods, shoe machinery and supplies, tools, and bicycles. It contains the villages of Campello, Montello, Marshall's Corner, Brockton Heights, Clifton Heights, and Salisbury Square. It was settled in 1700, was incorporated as a town in 1821, and chartered as a city in 1881. There are two national and two savings banks, a public library, with over 26,000 volumes; public school property valued at over \$500,000; and a property valuation exceeding \$26,000,000. Pop. (1900) 40,063.

Brockville, Canada, a town, port of entry, and county-seat of Leeds County, Ontario; situated on the St. Lawrence River, below the Thousand Islands, and on the Grand T., Canadian Pac., and Brockville & S. Ste. M. R.R.'s; 125 miles southwest of Montreal. It is a port of call for the St. Lawrence steamers, is lighted by gas and electricity, and has excellent water and sewerage systems. It contains several hospitals and asylums; a dozen churches; a number of hotels, and manufactories of agricultural implements, gloves, cigars, leather, sulphuric acid, and foundry and machine-shop products. It is named for Gen. Sir Isaac Brock (q.v.). Pop. (1901) 8,040.

Brockway, Howard, American musician: b. Brooklyn, N. Y., 22 Nov. 1870. He went to Germany to study music, spending five years in Berlin. In 1901 his 'Sylvan Suite' was produced in Boston. He has written orchestral works, chamber and choral music, songs, etc.

Brockway, Zebulon Reed, American penologist: b. Lyme, Conn., 28 April 1827. His connection with prison administration began at the Connecticut State Prison. He was connected successively with the penitentiaries of Albany and Monroe counties, N. Y., and with the House of Correction, Detroit, Mich. He is best known in connection with the penal-reform methods introduced during his superintendency of the New York State Reformatory at Elmira, a position which he filled from 1876-1900. He has written numerous papers and magazine articles on penology.

Broderick, brōd'rick, David Colbreth, American legislator: b. Washington, D. C., 4 Feb. 1820; d. Lake Merced, Cal., 16 Sept. 1859. He was defeated for Congress in New York in 1846; went to California, and was elected a member of the Constitutional Convention of 1849; served as speaker of the Senate; and was elected to the United States Senate in 1856, where he opposed the admission of Kansas.

Broderip, brōd'rip, William John, English naturalist: b. Bristol, 21 Nov. 1789; d. London 27 Feb. 1859. He graduated from Oriel College, Oxford, in 1812; studied law, and was called to the bar in 1817; and subsequently occupied several legal posts. In 1851 he became treasurer of Gray's Inn, with which office was combined that of librarian. He was an enthusiastic naturalist, and made many fine collections, his conchological cabinet being purchased for the British Museum. In 1847 he published 'Zoological Recreations,' and five years later appeared 'Leaves from the Note-Book of a Naturalist.'

Brod'head, John Romeyn, American historian: b. Philadelphia, 2 Jan. 1814; d. New York, 6 May 1873. He graduated at Rutgers College in 1831. He was author of a 'History of the State of New York,' and he made in Europe a valuable collection of documents bearing upon American history, that was published by the State of New York.

Brodiaea, brō-di-ē'a, a small genus of western American corm-rooted plants of the natural order *Liliaceae*, which are popular as garden flowers. The species are of low growth, and have several purple, red, white, or yellow funnel-shaped flowers on a scape. According to some authors several related genera are grouped in this, and cultural methods vary in consequence. For list of species and cultural directions consult: Bailey and Miller, 'Cyclopedia of American Horticulture' (N. Y. 1900-02).

Bro'die, Sir Benjamin Collins, English surgeon: b. Winterslow, Wiltshire, 9 June 1783; d. Broome Park, Surrey, 21 Oct. 1862. His father superintended his education till he was 18, after which he went to the Hunterian School of Anatomy. In 1803 he became a pupil of Sir Everard Home at St. George's Hospital, and in 1805 was appointed assistant to Mr. Wilson, demonstrator of anatomy. In 1809 he became a lecturer of the school and assistant surgeon of the hospital. In 1810 he was elected Croonian lecturer to the Royal Society, and the excellence of his papers caused him to be elected a Fellow, and in the following year he received the Copley medal. His reputation as a distinguished surgeon was now established, and his professional career became one of uniform success. From 1819 to 1823 he was professor of anatomy at the Royal College of Surgeons. In 1822 he was elected a full surgeon at St. George's. He continued giving clinical lectures there till 1830, when the increasing demands of his profession compelled him to discontinue them. In 1832 he succeeded Sir Everard Home as sergeant-surgeon to William IV., and was made a baronet by patent in 1834. Queen Victoria continued him in the same appointment. From 1835 to 1846 he was a member of the Court of Examiners of the College of Surgeons, and in 1844 he was president of the court. In 1858 he was elected president of the Royal Society, which honor he held till 1861. For some years before his death his sight failed, and for about two years he was almost totally blind. As a professional practitioner his gains exceeded those of almost any man of like profession in his time. In 1851 he republished a selection of his earlier essays, entitled 'Physiological Researches' His work on 'Pathological and Surgical Observations on Diseases of the Joints' (1818) was

esteemed of great value both in Great Britain and on the Continent, and went through many editions. In 1854 he published a work in a colloquial form entitled 'Psychological Inquiries.' The dialogue is not controversial, and the work contains the mature opinions of the author on various speculative subjects.

Brod'rick, George Charles, English educator: b. Castle Rising, Norfolk, England, 5 May 1831. He was educated at Eton and Balliol College, Oxford, and University of London. He was called to the bar in 1859. From 1877-9 he was a member of the London School Board. In 1881 he became warden of Merton College. Among his works are: 'Political Studies'; 'English Land and English Landlords'; 'Memorials of Merton College'; 'Short History of Oxford University'; and 'Memories and Impressions.'

Brodrick, William St. John Freemantle, English statesman: b. 14 Dec. 1856. He was educated at Eton and at Balliol College, Oxford. From 1880-5 he was member of Parliament for West Surrey; 1886-92, financial secretary to the war office; 1895-8, under-secretary of state for war; 1898-1900 under-secretary of state for foreign affairs; afterward becoming secretary for war.

Brod'sky, Adolf, Russian violinist: b. Taganrog, South Russia, 21 Feb. 1851. He first played in public at the age of nine, and later went to Vienna to pursue his musical studies. In 1879 he became director of the symphony concerts in Kieff, and later held a professorship in the Leipsic Conservatory. As a soloist he appeared in concerts in several of the leading cities of Europe. He came to the United States and taught for a time in Scharwenka's Conservatory, New York, but returned to Leipsic. In 1895 he was made director of the Royal College of Music, Manchester, England.

Bro'dy, Austria, a town in Galicia, near the Russian frontier, 58 miles east-northeast of Lemberg, on a swampy plain. It has broad streets, houses mostly built of stone, an old castle, three churches, Jewish synagogue, etc. About two thirds of its inhabitants are Jews, who have a hospital for themselves and a college for the instruction of artists and mechanics. The commerce, carried on principally by Jews, is important, the town being favorably situated for the interchange of goods between Austria and Russia, and Turkey. Pop. about 20,000.

Broglie, brô-lê, a family distinguished in the annals of French wars and diplomacy, which derives its origin from Piedmont. Among its members are:

1. **FRANÇOIS MARIE, DUC DE**, French soldier: b. Paris, 11 Jan. 1671; d. Ferrières, 22 May 1745. From 1689 he fought with distinction in the Netherlands, Germany, and Italy. He was also employed in diplomatic affairs, and concluded a treaty between France, England, and Prussia in 1725. He rose by degrees till in 1734 he became marshal of France. In the war of the Austrian succession he had the chief command of the armies in Bavaria and Bohemia.

2. **VICTOR FRANÇOIS, DUC DE**, French soldier: b. (the eldest son of the preceding), 19 Oct. 1718; d. Münster, 1804. He commenced his career under his father in the battles of Guastalla and Parma (1734); was engaged in all the wars of France, and was created marshal in 1759.

Jomini considered him the only French general who had shown constant ability during the Seven Years' war. He was engaged in the battles of Hastenbeck, Rossbach, Sondershausen, and Lützelberg, and, being appointed to the chief command, defeated the Prussians and Hessians at Bergen in 1759, for which Francis I. of Austria created him a prince of the empire. In 1760 he gained another victory at Corbach, but was defeated, together with the Prince of Soubise, at Willingshausen, in the following year. In consequence of this and the favor of Soubise at court he was exiled. He was recalled in 1764, and in 1789, when the Revolution broke out, Louis XVI. appointed him minister of war; at the same time he received the command of the troops that were to keep Paris in check. The desertion of the National Guard rendered all his efforts vain, and Broglie left France. In the campaign of 1792 he commanded a division of the *émigrés* without success. After its close he withdrew entirely from public life.

3. **VICTOR CLAUDE, PRINCE DE BROGLIE**, French soldier: b. (third son of the preceding), 1757; d. Paris, 27 June 1794. He entered at first into the views of the revolutionary party. He was deputy of the nobility of Colmar to the States-General in 1789. After the dissolution of the Constituent Assembly he was appointed field-marshal in the army of the Rhine, but upon his refusal to acknowledge the decree of 10 August, suspending the royal authority, was deprived of his command, summoned before the revolutionary tribunal, and led to the guillotine.

4. **ACHILLE CHARLES LÉONCE VICTOR, DUC DE**, French statesman: b. Paris (son of the preceding), 1 Dec. 1785; d. Paris, 25 Jan. 1870. In 1816 he married a daughter of Madame de Staël and was made a member of the chamber of peers. After the Revolution of 1830 the Duc de Broglie and Guizot were the heads of the party known as *doctrinaires*. He was minister of public instruction for a short time in 1830, and minister of foreign affairs from October 1832 to April 1834. In 1849 he was a conservative member of the Legislative Assembly, and after the *coup d'état* he continued a bitter enemy of the imperial régime. His later years were devoted to philosophical and literary pursuits.

5. **JACQUES VICTOR ALBERT, DUC DE**: b. Paris (son of the preceding), 13 June 1821; d. 1901. In 1846 he became secretary to the embassy at Madrid, whence he was transferred to that at Rome, but the revolution of 1848 caused him to give up public life. From that time he became known as an able writer in political reviews. In 1856 he published 'L'Histoire de l'Eglise et de l'Empire' in six volumes, a work which gained him a chair in the Academy. In 1871 he was elected to the National Assembly for the department of Eure, and in the same year became ambassador at London. He led the opposition to Thiers during 1872-3, and finally succeeded in defeating him. In the latter year he became minister of foreign affairs and president of the council, but in 1874 he suffered defeat. In 1885 he again gave up political life and devoted himself to his historical studies. Among his works are 'Le Secret du Roi Louis XV.' (1878); 'Frédéric II. et Marie-Thérèse' (1883); 'Maurice de Saxe et le Marquis d'Argenson' (1891); 'La Paix d'Aix-la-Chapelle' (1892); 'Le Père Lacordaire' (1895); 'Malherbe' (1897); etc.

BROGNY — BROKER

Brogný, Jean Allarmet, zhõn äl-lär-mä brõn-yê, Italian cardinal: b. Brogny, near Annecy, Savoy, 1342; d. Rome, 16 Feb. 1426. Although a swineherd in his youth, he attained, by his learning and virtues, a position of great influence and eminence in the Church. He was successively made bishop of Viviers, of Ostia, archbishop of Arles, and bishop of Geneva, and finally cardinal and chancellor of the Church of Rome. During the great schism which divided the Church for more than 40 years Brogny devoted himself to the work of conciliation. The Council of Constance being called for that purpose by John XXIII. and the Emperor Sigismund, the former was deposed at the sixth session, after which Brogny presided as senior cardinal until the 41st, when Cardinal Colonna was elected Pope, 14 Nov. 1417, chiefly through Brogny's influence, under the name of Martin V., and the holy see was once more established at Rome. As president of the Council of Constance he had to pronounce the sentence of death upon Huss, to whom he had shown great kindness during the trial, having visited him several times in his prison and exhorted him, but in vain, to save his life by recanting his creed. The cardinal was the founder of the hospital of Annecy, and of the College of St. Nicolas at Avignon.

Brogue, brõg (Ir. and Gael. *brog*), a coarse and light kind of shoe made of raw or half-tanned leather, of one entire piece, and gathered round the foot by a thong, formerly worn in Ireland and the Highlands of Scotland. The term is also used of the mode of pronunciation peculiar to the Irish, but whether the word in this sense is the same as in the other is doubtful.

Broiling, the cooking of meat or fish on a gridiron above a fire, or by laying it directly on the coals, a very wholesome method of cookery. See COOKERY.

Broke, Sir Philip Bowes Vere, British admiral: b. Ipswich, 9 Sept. 1776; d. 2 Jan. 1841. He entered the navy in 1792, and, after he had seen much active service, distinguished himself in 1813 as commander of the frigate *Shannon*, in the memorable action which that vessel, in answer to a regular challenge, fought with the *Chesapeake* off the American coast. The *Shannon*, carrying 38 guns and 330 men, in an engagement of only 15 minutes boarded and captured the *Chesapeake*, carrying 49 guns and 440 men. Sir Philip, who was severely wounded in the action, was immediately made a baronet, and in 1815 Knight Commander of the Bath. He became rear-admiral in 1830.

Broken Hill, Australia, a mining town in the western part of New South Wales, south of Stanley Range, about 925 miles west of Sydney. It stands in a district which contains many silver mines; and asbestos, lead, gold, copper, etc., are also found here. One of the silver mines, the Proprietary, is the most productive in the world. It is connected with Silverton and Adelaide by rail. Pop. about 20,000.

Broken-wind, a disease in horses, often accompanied with an enlargement of the lungs and heart, which disables them for bearing fatigue. In this disease the expiration of the air from the lungs occupies double the time that the inspiration of it does; it requires also two

efforts rapidly succeeding each other, attended by a slight spasmodic action, in order fully to accomplish it. The disease is caused by rupture of the air-cells, and there is no known cure for it. See HEAVES.

Broker (Lat. *abroccator*, perhaps from the Saxon *abroccan*, to break up, from which is derived "abbroachment," the breaking up of goods or selling at retail). The early use of this term designated a retailer of goods, generally supposed to belong to another person, and thence applied to any one making a bargain as the agent of another for the sale or purchase of goods. The distinctive character of a broker was that he acted in behalf of another and in his name; at least, when the contract came to be consummated, the name of the principal was in the ordinary course disclosed. It was a further incident of a broker's employment that he did not have possession of the goods sold, or receive possession of the goods purchased, in which respect he differed from a factor. And these principles still apply. But the office of broker has been vastly extended by the increasing exigencies of commercial business.

The most important kinds of brokers are here enumerated. Bill and note brokers negotiate the purchase and sale of bills of exchange and promissory notes. They are paid a commission by the seller, and it is not their custom to disclose the names of their principals. There is an implied warranty that what they sell is what they represent it to be, and should a bill or note sold by them turn out to be a forgery, they are held to be responsible; but it would appear that by showing a payment over to their principals, or other special circumstances attending the transaction proving that it would be inequitable to hold them responsible, they will be discharged. (Edwards, Bills, 291; 4 Duer, 79.) The authorities, however, are not in harmony upon this question. (See 3 Allen 258; 1 Hill 287; 21 E. C. L. 379.) Exchange brokers negotiate bills of exchange drawn on foreign countries, or on other places in this country. It is sometimes part of the business of exchange brokers to buy and sell uncurrent bank notes and gold and silver coins, as well as drafts and checks drawn or payable in other cities; although, as they do this at their own risk and for their own profit, it is difficult to see the reason for calling them brokers. Insurance brokers procure insurance, and negotiate between insurers and insured. Merchandise brokers negotiate the sale of merchandise without having the possession or control of it, as factors have. Pawnbrokers lend money in small sums, on the security of personal property, at usurious rates of interest. They are licensed by the authorities, and excepted from the operation of the usury laws. Real estate brokers are those who negotiate the sale or purchase of real property. They are a numerous class, and, in addition to the above duty, sometimes procure loans on mortgage security, collect rents, and attend to the letting and leasing of houses and lands. Ship brokers negotiate the purchase and sale of ships and the business of freighting vessels. Like other brokers they receive a commission from the seller only. Stock brokers are those employed to buy and sell stock in incorporated companies. The stock brokers are associated together in the larger cities under the name of the Board of Brokers.

BROMAL HYDRATE—BROMIDROSIS

(See STOCK EXCHANGE.) This board is an association, admission to membership in which is guarded with jealous care. Membership is forfeited for default in carrying out contracts, and rules are prescribed for the conduct of the business, which are enforced on all members. The purchases and sales are made at sessions of the board, and are all officially recorded and published by an officer of the association. Stock brokers charge commission to both buyers and sellers of stocks.

Bro'mal Hydrate is prepared by adding bromine to iced alcohol, distilling and combining with water. Its crystals resemble those of chloral hydrate in appearance and chemical properties, and are soluble in water. The drug has a sedative action tending to produce sleep, and is employed in nervous conditions and to diminish the attacks in epilepsy. It has little effect on pain, and should not be used when the heart is weak or the stomach upset.

Bro'mamide, a volatile crystalline substance without odor or taste and containing bromine. It is insoluble in water and is employed as a sedative in acute and chronic rheumatism and neuralgia.

Bromberg, bröm-bärn, Prussia, a town in the province of Posen, 69 miles northeast of the city of that name; situated on the Brahe six miles west of its confluence with the Vistula. It is well built, has two Protestant and two Roman Catholic churches, a synagogue, asylum for the blind, a gymnasium, and a real-gymnasium. Pop. (1895) 46,417.

Brome, Alexander, English poet and dramatist: b. 1620; d. 1666. He seems to have been a lawyer by profession, and at one time attorney to the court. He is best known as the author of many royalist songs and epigrams. He published 'The Cunning Lovers,' a comedy (1654); 'Fancy's Festivals' (1657); 'Songs and Poems' (1661); 'Translation of Horace' (1666).

Brome, Richard, English dramatist: d. about 1652. He was at first the servant and afterward the friend of Ben Jonson, who encouraged him in his literary work, and on whose style his plays are modeled. The best and most popular of his dramas, some of them comedies dealing with the everyday life of his time and others of a more romantic character are: 'The Court Beggar' (acted 1632); 'The Love-sick Court' (published 1659); 'The Queen and Concubine' (published 1659); 'The Northern Lass' (printed 1632); 'The Sparagus Garden' (acted 1635); 'The Antipodes' (acted 1638), and 'A Jovial Crew' (acted 1641).

Brome-grass, the common name of the genus *Bromus*. Nearly 200 species have been described, occurring in both the Old and the New World. They are known by having their spikelets many-flowered, two awnless glumes to each floret, two paleæ or valves, the lowermost of which has a rough, straight, rigid awn proceeding from below the tip of the valve. These grasses have great power of resisting drought, and have proved themselves valuable forage plants on the high, dry plains of the western United States. Some species are cultivated for hay in the eastern States, but are not much relished by cattle. The giant brome-grass is known as cheat or chess, and is found in wheat-fields. This has been introduced from Europe.

Bromelia, a genus of about 25 species of monocotyledonous, stemless herbs of the natural order *Bromeliaceæ*, natives of tropical America, introduced into other warm climates for the sake of the fibre obtained from their leaves, and cultivated in greenhouses to some extent for ornament. The species have stiff leaves like the pineapple, and flowers in panicles. *B. pinguin*, the wild pineapple or pinguin, a native of the West Indies, is perhaps best known because of its use as a tropical hedge-plant, for which its numerous sword-shaped, spiny, rigid leaves, three to six feet long, and two inches wide, specially adapt it. The leaves are also ornamental, being bright green at first and turning red with age. The reddish pubescent flowers in compact panicles are followed by edible fruits as large as plums. These fruits are used to make a pleasant cooling drink. *B. sylvestris*, which has smaller leaves, furnishes a fibre said to be superior to the preceding species. Other species also yield a fibre of greater or less value.

Bro'mic Acid (HBrO₃), a monobasic acid, forming salts called bromates. When bromine is dissolved in caustic potash a mixture of bromide and bromate of potassium is obtained, which can be separated by crystallization, $3\text{Br}_2 + 6\text{KHO} = 5\text{KBr} + \text{KBrO}_3 + 3\text{H}_2\text{O}$. Free bromic acid can be prepared by passing chlorine into bromine water, $2\text{Br} + 10\text{Cl} + 6\text{H}_2\text{O} = 2\text{HBrO}_3 + 10\text{HCl}$. The acid is best obtained by decomposing potassium bromate by argentic nitrate, and acting on the resulting argentic bromate by bromine, $5\text{AgBrO}_3 + 3\text{Br}_2 + 3\text{H}_2\text{O} = 5\text{AgBr} + 6\text{HBrO}_3$. Bromic acid is a strongly acid liquid, reddening and then bleaching litmus paper. On concentration at 100° it decomposes into bromine and oxygen. It is decomposed by sulphur dioxide (SO₂), by sulphide of hydrogen (H₂S), and by hydro-bromic acid (HBr). Bromates are with difficulty soluble in water, and are decomposed on heating into oxygen and bromides.

Bromide, brō'mīd, a combination of bromine with a metal or a radical. Bromides are soluble in water, except silver and mercurous bromides; lead bromide is very slightly soluble. They are detected in analysis by the following reactions: Argentic nitrate gives a yellowish precipitate of AgBr, insoluble in dilute nitric acid, and soluble in strong ammonia. Chlorine liberates bromine, and, if the liquid is shaken up with ether, a yellow ethereal solution floats on the liquid. Heated with sulphuric acid and MnO₂, bromides yield vapors of Br, which turns starch yellow.

Bromidro'sis (bromos, a bad odor + hidros, sweat), malodorous or stinking perspiration, usually excessive in quantity and due mostly to bacterial decomposition of the sweat. The parts most affected are the arm-pits and the feet, but the latter are not attacked in persons who go barefoot. The victims are mostly anæmic, nervous persons. Very hot water, formaldehyde, salicylic acid, and boric acid are the most used applications, the latter being dusted in shoes and stockings. The sweat also sometimes smells of certain odoriferous substances, not necessarily offensive, which have been taken; for example: asafetida, copaiba, denzovic acid, musk, onion, or garlic. It also may develop a peculiar odor in cholera, smallpox or typhoid fever, and smell

BROMINE—BRONCHITIS

of urine in uremia. Rarely it gives a pleasant odor of violet or pineapple. The sweat in some colored races has a distinctive, unpleasant smell.

Bro'mine, a non-metallic element. Symbol Br; atomic weight, 79.4 for $H=1$, or 80.0 for $O=16$. Bromine was discovered in 1826 by Balard, in the salts obtained by the evaporation of sea water. Bromine is liberated from the sodium and magnesium salts by the action of free chlorine, and is separated by ether, which dissolves the bromine. This red-colored solution is removed, saturated with potash, evaporated, and heated to redness, and the bromide of potassium is heated with manganese dioxide and sulphuric acid. The bromine is liberated in the form of a deep red vapor, which condenses into a dark, reddish-black liquid. Specific gravity, 2.97. It boils at 63° , and its vapor density is 5.54 times that of air. It has an irritating smell, and when inhaled is poisonous. It dissolves in 30 parts of water, and the solution has weak bleaching properties. Bromine and hydrogen do not unite in the sunlight, but do when they are passed through a red-hot porcelain tube, forming hydrobromic acid (HBr), which is also obtained by the action of phosphorus and water on bromine. It is a colorless, fuming gas, which liquefies at 73° , very soluble in water. The concentrated solution contains 47.8 per cent of HBr; it boils at 126° , and has powerful acid properties; it neutralizes bases, forming bromides and water. Hypobromous acid, $HBrO$, is only known in solutions; it has bleaching properties. Bromine can displace chlorine from its compounds with oxygen, while chlorine can liberate bromine from its compounds with hydrogen. Free bromine turns starch yellow.

Bromine has been applied externally as a caustic but rarely. Its chief official preparations are bromide of ammonium, useful in whooping-cough, infantile convulsions, and nervous diseases generally; and bromide of potassium, now very extensively used, especially in epilepsy, hysteria, delirium tremens, diseases of the throat and larynx, bronchocele, enlarged spleen, hypertrophy of liver, fibroid tumors, etc. Also, as an antaphrodisiac, for sleeplessness, glandular swellings, and skin diseases. The alterative properties of bromide of potassium are similar to, but less marked than, those of the iodides. Its preparation is the same as iodide of potassium, substituting an equivalent quantity of bromine for iodine— $6KHO + Br_2 = 5KBr + KBrO_3 + 3H_2O$. It has a pungent saline taste, no odor, and occurs in colorless cubic crystals, closely resembling the iodide. As a hypnotic its usefulness is much increased by combining it with morphia or chloral hydrate.

Bro'mipin, a yellow, bland liquid of simple oily taste, and composed of oil of sesame with 10 per cent of bromine. It is easily borne by the stomach and does not readily produce bromism, therefore in some cases it is substituted for the bromides which it resembles in its action on the nervous system.

Bro'mism, a condition which results from the accumulation of bromides in the system, owing to the ingestion of greater quantities than the body can get rid of. The breath is fetid, the skin breaks out in an acne eruption, the throat is insensitive to touch so that it may be tickled with a feather, and there is loss of memory,

heaviness of intellect, great sleepiness, and depression of spirits. If the drug is still continued there may be paralysis, loss of sight and hearing, inability to speak above a whisper, and various symptoms of mental derangement. The symptoms usually quickly subside on stopping the drug.

Bromley, England, a town of Kent, 10 miles south-southeast of London. It has a market square with a large market-house, and has rapidly increased by the erection, in its vicinity, of large groups of houses occupied by London merchants. The most notable place of worship is the modern church of St. Peter and St. Paul. Pop. (1901) 27,358.

Bro'moform, a clear, heavy, volatile liquid of ethereal odor and sweetish taste, soluble in alcohol or ether though not in water. It is analogous to iodoform and chloroform, and is made like the latter from alcohol or acetone. It is somewhat anesthetic and has been used like chloroform, but its special use is in "whooping-cough," in which a few drops are given in solution or mixture several times a day.

Bro'mol, the precipitate formed when bromine water is added to a solution of carbolic acid. It occurs in crystals, is antiseptic, and may be taken internally for diarrhoea or cholera morbus, or applied to wounds or ulcers in the form of a salve.

Brompton, England, a suburban district of London, in Kensington, associated with the names of Burke, Canning, and other eminent men.

Bromus. See BROME GRASS.

Bromvogel, the South African name for the hornbill (q.v.).

Bronchi, brōng'kī, the two branches into which the trachea or windpipe divides in the chest, one going to the right lung, the other to the left, and ramifying into innumerable smaller tubes—the bronchial tubes. See LUNGS.

Bronchitis (Gk. bronchia, the bronchial tubes + itis, a suffix denoting inflammation), inflammation of the bronchi. Acute bronchitis is a "cold in the chest," and may be simple or may accompany typhoid fever, malaria, influenza, whooping-cough, or tuberculosis. It is very common in young children, in the aged, and in those whose work involves the inhalation of fumes or dust. Sedentary indoor occupations and overheated rooms are predisposing conditions. In some people the bronchi are very susceptible, and "catching cold" means an attack of bronchitis. The mucous membrane of the bronchi is red, swollen, and inflamed, and after the first day or two exudes large quantities of mucus which must be coughed up. There may be a sudden onset with pains in the back and limbs, a feeling of languor and restlessness, tightness or pain in the chest, and fever. The cough is at first dry, but soon is accompanied by much sputum. Often the symptoms are very slight, lasting only a day or two, but the usual duration is one or two weeks. Complete return to health may be much delayed. In infants and old people pneumonia frequently supervenes. At the onset a hot foot-bath, hot lemonade to produce free sweating, a mustard plaster to the chest, and a cathartic may cut short an attack. Later ipecac, senega, squills, ammonia, etc., are



A PITCHING BRONCHO

BRONCHOCELE — BRONSART

given to loosen the mucus and relieve the congestion. Codeine will allay the cough. Chronic bronchitis occurs most frequently in middle life or old age, and commonly accompanies disease of the heart, liver or kidneys, and gout. Cold and changeable weather brings on the symptoms year after year, so that a person will "take cold every time the weather changes." The mucous membrane is atrophied, or in places thickened, and the tubes are irregularly dilated. There may be shortness of breath on exertion, asthmatic attacks, spells of coughing, profuse expectoration, and occasionally spitting of blood. Fever is rare. The general health is not impaired to the extent that it is in tuberculosis, but a change to a dry, bracing climate may be advisable. Turkish baths, creosote, ipecac, and potassium iodide are among the favorite remedies. A form of acute or chronic bronchitis, in which membranous casts of the bronchial tubes are formed and coughed up, is known as fibrinous bronchitis. Consult Allbutt's 'System of Medicine'; and Osler's 'Principles and Practice of Medicine.'

Bronchocele, bröŋg'kō-sēl, an indolent tumor on the forepart of the neck, caused by enlargement of the thyroid gland, and attended by protrusion of the eyeballs, anæmia, and palpitation.

Bronchotomy, bröŋg-kōt'ō-mī, in surgery, an incision into the windpipe or larynx, between the rings, to afford a passage for the air into and out of the lungs when any disease prevents respiration in the usual way, or to extract foreign bodies which have got into the trachea, or in cases of suffocation, drowning, etc. It is known as tracheotomy or laryngotomy, according as the windpipe or the larynx is operated on.

Bronco, or **Broncho**, the small horse of the plains in western United States and in Mexico. In Texas it is called "Mustang." It is descended from the horses of Arabian stock, brought to America by the early Spaniards, and exhibits still certain Arabian features due to this ancestry. Many of the Spanish horses were captured by the Indians, and some escaped from their owners. Of the former, great numbers deserted their Indian captors, and roamed with their free companions over the plains of the Southwest, where they multiplied rapidly, and adapted themselves to the local conditions of climate and vegetation. Thus they returned to a wild state in this country, which has been considered as the original habitat of the horse family, but which presents nowhere, unless on the pampas of South America, an aboriginal type of horse. These wild horses have more recently been captured, and bred in captivity; and have been modified by admixture of blood with horses from the eastern United States. They are famous for their endurance, despite their rather weak hind quarters. Their heads are proportionately very large, and not handsome, but the little animals are extremely intelligent and serviceable.

Brondel', John B., American clergyman: b. Bruges, Belgium, 1842. He studied in the American College of the University of Louvain and was ordained to the Catholic priesthood in 1864. He came to America and from 1867-77

was rector at Steilacoom, Wash., and at Walla Walla, 1877-8. In 1879 he became bishop of Vancouver Island, and was appointed, in 1883, administrator apostolic of Montana, becoming later bishop of Helena. Bishop Brondel is especially known for his labors among the Indians.

Brongniart, Adolphe Théophile, a-dōlf tā-ō-fēl brō-nyār, French botanist, son of Alexandre Brongniart: b. Paris, 14 Jan. 1801; d. there, 19 Feb. 1846. He first studied medicine, and received his diploma of doctor of medicine in 1826; but afterward turned his attention to the physiology of plants and antediluvian phytology. In 1834 he was elected a member of the Academy of Sciences, as successor to Desfontaines; and in 1839 professor of botany at the Museum of Natural History in Paris. His researches were various, and among his numerous works are 'Histoire des végétaux fossiles' (1828-47); 'Essai d'une classification naturelle des champignons' (1825); 'Mémoire sur la structure et les fonctions des fenilles' (1871).

Brongniart, Alexandre, ä-lēks-ändr, naturalist and mineralogist: b. Paris, 5 Feb. 1770; d. there, 7 Oct. 1847. He turned his attention at a very early age to the study of the ceramic art; and after having served for some time in the army on the medical staff, was appointed, in 1800, director of the porcelain manufactory at Sèvres, where he revived the art of painting on glass. In 1807 appeared his 'Traité Élémentaire de Minéralogie'; and about the same time his labors in the department of natural history brought him into contact with Cuvier, whom he aided materially in classifying the newly discovered fossils of Montmartre. Along with Cuvier he engaged in the composition of the 'Essai sur la Géographie Minéralogique des Environs de Paris,' first published in 1811, and afterward in 1822, much enlarged, under the title of 'Description Géologique des Environs de Paris.' In 1844 appeared his 'Traité des Arts Céramiques.' He succeeded Haüy as professor of mineralogy in the Museum of Natural History in 1822.

Broni, brō'nē, a town of northern Italy, with mineral springs, 11 miles southeast of Pavia. Near by is the castle of Broni, where Prince Eugène obtained a victory over the French in 1703.

Bronn, Heinrich Georg, hīn-rīh gā-ōrīh brōn, German naturalist: b. Ziegelhausen, 1800; d. 1862. He was educated at the University of Heidelberg, where he was nominated professor in 1833, and appointed lecturer on zoology in succession to Leonhard. Among his various scientific works may be named 'A System of Antediluvian Zoophytes' (1827); 'Lethæa Geognostica,' an important geological work (1837); 'History of Nature' (1841-9); and 'Universal Zoology' (1850).

Bronsart, Hans von, hänts fōn brōn-sār (properly SCHELLENDORFF, HANS VON BRONSART), German musician: b. Berlin, 1830. He studied in Berlin and Weimar, becoming a pupil of Liszt. After tours to European cities he directed concerts in Berlin. From 1867-87 he was intendant of the Royal Theatre in Hanover, and from 1887-95 filled a similar position in Weimar. His compositions for the piano are among the best known of his works. He wrote also the orchestral pieces, 'Christnacht' and 'Frühlingsphantasie.'

BRONTE — BRONTOSAURUS

Brontë, brôn'tā, Anne (ACTON BELL), English novelist: b. Haworth, Yorkshire, 24 March 1820; d. Scarborough, 28 May 1849. She was a younger sister of Charlotte Brontë (q.v.), and under the pen name of ACTON BELL wrote 'Agnes Grey' (1847), and 'The Tenant of Wildfell Hall' (1848).

Brontë, Charlotte (CURRER BELL), English novelist: b. Thornton, Yorkshire, 21 April 1816; d. Haworth, 31 March 1855. She was the third daughter of the Rev. Patrick Brontë, a native of Ireland, who changed his original name Prunty to Brontë, and at the time of her birth was rector of Thornton. He removed in 1820, on becoming incumbent of Haworth, a moorland village in the West Riding of Yorkshire, about four miles from Keighley. Her mother died soon after this removal, and her father, an able though eccentric man, brought up Charlotte and her sisters in Spartan fashion, inuring them to every kind of industry and fatigue. This object, however, was not judiciously carried out; the children were insufficiently nourished, were debarred from companionship and the usual amusements of childhood, and though to this training may no doubt in great part be ascribed the development of the peculiar genius which they subsequently displayed, there can be no doubt of its having contributed to foster the seeds of pulmonary disease, which afterward cut them off at an untimely age. After an education, received partly at home and partly at the schools of Cowan's Bridge and Roe Head, Charlotte entered the latter for a time as a teacher, but soon found herself compelled by ill health to abandon the occupation. She then filled successively two situations as governess in a family, and in 1842 went with her sister Emily to Brussels, with the view of acquiring a knowledge of the French and German languages, and thereby qualifying themselves better to act as teachers. From Charlotte's life there much of the description in her novel 'Villette' is derived. The two eldest daughters having died many years before, and an only brother having also gone, Charlotte, with her sisters Emily and Anne, were the only members of the family still remaining to their father. They resolved now to turn their attention to literary composition, for which their early studies well qualified them; and in 1846 a volume of poems by the three sisters was published, under the names of Currer, Ellis, and Acton Bell. It was issued at their own risk, and attracted little attention, so they quitted poetry for prose fiction, and produced each a novel. Charlotte (CURRER BELL) entitled her production 'The Professor,' but it was everywhere refused by the publishing trade, and was not given to the world till after her death. Emily (ELLIS BELL) with her tale of 'Wuthering Heights,' and Anne (ACTON BELL) with 'Agnes Grey,' were more successful. Charlotte's failure, however, did not discourage her, and she composed the extraordinary novel of 'Jane Eyre,' which found a purchaser in the firm of Messrs. Smith & Elder, and appeared in October 1847. Its success was immediate and decided; and being published anonymously, numerous speculations were excited as to its authorship, many maintaining that the reflections expressed, and the general delineation of the characters in the story, were of too masculine an order to be the production

of a woman, while at the same time it was perfectly evident that none but a woman could have executed some of the touches. Her second novel, 'Shirley,' appeared in 1849, but though both possessing considerable merit and tolerably successful, it falls far below 'Jane Eyre.' She now visited London, and shone for a time as one of its literary celebrities. In the autumn of 1852 appeared 'Villette,' the scene of which is almost entirely laid in a school at Brussels, but it possesses nevertheless an immense interest, which never flags from the beginning to the end of the book. A painfully morbid tendency indeed, the result of an unhealthy physical organization, is conspicuous in this, as in the other writings of Charlotte Brontë. Shortly after its publication an offer of marriage was made to her by her father's curate, the Rev. Arthur Bell Nicholls, but owing to her father's objections their union was for a time impeded. Mr. Brontë ultimately changed his mind and gave his consent, and his daughter was married to Mr. Nicholls in June 1854. Consumption, however, had already marked her, like her sisters, for a victim, and nine months after her marriage she died at Haworth, in the churchyard of which she lies buried. Her originally rejected tale of 'The Professor' was published after her death, in 1857. Her works were in large part an expression of herself; at times the best expression of herself — of her actual self in experience and of her spiritual self in travail and in aspiration. It is manifestly impossible therefore to consider the works of Charlotte Brontë with justice apart from herself. A correct understanding of her books can be obtained only from a study of her remarkable personality and of the sad circumstances of her life. See Gaskell, 'Life of Charlotte Brontë' (1857); Reid, 'Charlotte Brontë' (1877); 'Charlotte Brontë and Her Circle' (1896).

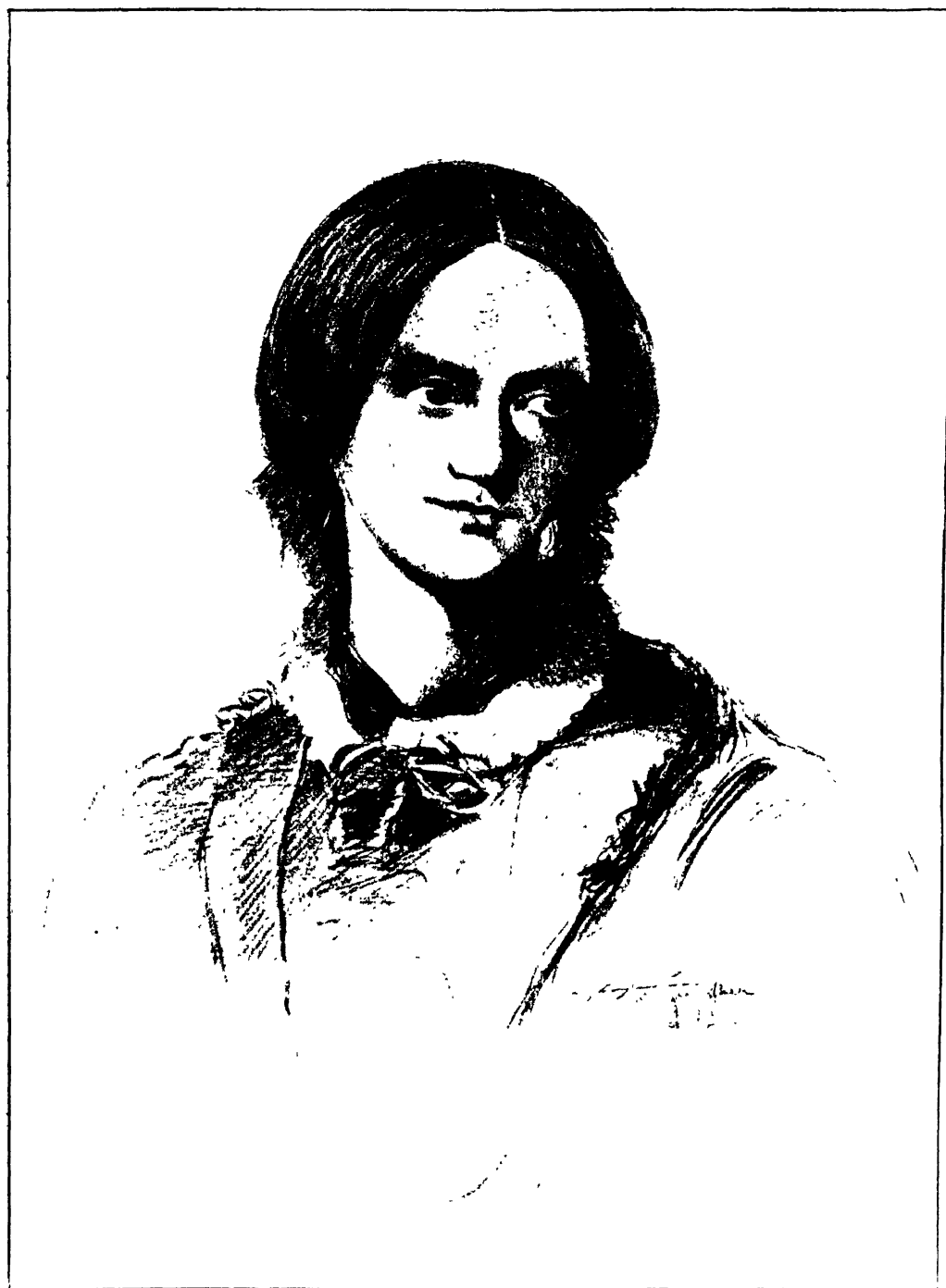
Brontë, Charlotte, and Her Circle, a volume by Clement K. Shorter, published in 1896. The arrangement of the book is calculated to assist the reader to a clearer understanding of Charlotte Brontë's life. A chapter is given to each person or group of persons in any way closely related to her.

Brontë, Charlotte, Life of, a noted biography by Mrs. Gaskell, published in 1857. It has taken rank as a classic in biographical literature, though not without inaccuracies. Its charm and enduring quality are the result of its ideal worth. It is a strong, human, intimate record of a unique personality.

Brontë, Emily Jane (ELLIS BELL), English novelist; sister of Charlotte Brontë: b. Thornton, Yorkshire, 20 Aug. 1818; d. Haworth, 19 Dec. 1848. 'Wuthering Heights' (1847), a powerful but morbid novel, was her chief work. See Robinson, 'Emily Brontë' (1883); Birrell, 'Life of Emily Brontë' (1887).

Bronte, brôn'tā, a town of Sicily, in the province of Catania, 22 miles north-northwest of the city of Catania, in a picturesque situation at the west base of Mount Etna. Lord Nelson was created Duke of Bronte by the Neapolitan government in 1799. Pop. (1901) 20,366.

Brontosau'rus, a gigantic extinct reptile of the Jurassic period. It was one of the largest of the Sauropoda or amphibious dinosaurs



From the drawing by Richmond

CHARLOTTE BRONTË

BRONTOTHERIUM — BRONZE AGE

(q.v.), reaching a length of 65 feet. The thigh-bone is six feet in length, and weighs in its petrified state 500 to 600 pounds. The animal resembled the *Diplodocus* (q.v.) in proportions, but was more massive and unwieldy. Its bones are not uncommonly found in the fresh-water shales of the Como formation in Wyoming; the weathered and broken limb-bones lying exposed on the surface of the ground are said to have been mistaken by early explorers for pieces of fossil tree-trunks. Several incomplete skeletons are preserved in American museums.

Brontotherium, or **Titanotherium**, a genus of the extinct mammals first found in the Bad Lands of South Dakota, and later in Nebraska and Colorado. The formation is Miocene and the genus is but one of an extinct family of herbivorous mammals. It had the following features: The skull was long and depressed, with a large pair of horn cores, placed transversely on the maxillary bones, in front of the orbits; the nasal bones, which were greatly developed and firmly co-ossified, protruded over the narial orifice; the brain cavity was small and did not extend over the cerebral hemispheres or the cerebellum, and but little over the olfactory lobes; the neck was of medium length and stout; axis was large and extended transversely, being massive, with odontoid process stout and conical; lumbar vertebrae were slender and not as large as the dorsals, and there were four sacral vertebrae; a long and slender tail, indicated by the caudals; limbs somewhat shorter than the elephant's; radius separated from the ulna; carpal bones short and supporting four toes; tibia separated from the fibula; three toes of almost equal size on the hind foot; the bones all solid. The brontotherium was about the size of the elephant. The nose was evidently flexible, but there was no true proboscis.

Bronx, The, a borough of Greater New York, north and east of the borough of Manhattan, between the Hudson and East rivers and Long Island Sound. Within its limits are North and South Brother, City, Riker's, Hunter's, Twin, Hart, High, and several adjacent islands, and seven parks, Bronx Park containing a botanical garden of 250 acres, and the New York Zoological Gardens.

Bronze, an alloy consisting of proportions of copper and tin, varying according to the purpose desired, to which lead, zinc, and silver also, are sometimes added for the purpose of giving greater brilliancy to the compound, or rendering it more fusible, the zinc being introduced in the form of brass. In some of the modern bronzes, brass is used instead of tin; these are then nothing more than brass, consisting of very large proportions of copper. Bronze was used by the ancient Assyrians and Egyptians. Layard brought many ornaments and other articles of this metal from Assyria. It is more fusible, as well as harder than copper, and has also a fine-grained metal, taking a smooth and polished surface; hence its universal use, both in ancient and modern times, in making casts of all kinds, medals, bas-reliefs, statues, etc. Its color is a reddish-yellow, and is darkened by exposure to the atmosphere. It has been found, on examination, that the bronze weapons of the Greeks and Romans were of the best composition for securing the greatest density in the alloy, and

the cutting edges were brought to the highest point of tenacity by hammering. Gun-metal consists of about 90 parts of copper to 9 or 10 of tin. Old cannon are frequently used for casting statues, for which the proportions are similar. Bell-metal consists of 78 of copper and 22 of tin. For edge-tools—copper, 100 parts; tin, 14. For medals—copper, 89; tin, 8; zinc, 3, are used. For ornamental articles, zinc and lead are frequently added. These four metals are usually contained in the bronzes of France. There is some difficulty in making bronze, from the liability to the loss of tin, zinc, etc., by oxidation. A greenish color is imparted to ancient bronzes by oxidation, which is imitated in modern bronzes by chemical appliances. An alloy called phosphor-bronze, consisting of about 90 per cent of copper, 9 of tin, and from .5 to .75 of phosphorus has been found to have peculiar advantages for certain purposes. The addition of phosphorus increases the homogeneity of the compound, and by varying the proportion of the constituents, the hardness, tenacity, and elasticity of the alloy may be modified at pleasure. Great hardness and tenacity with little elasticity can be conferred on it for the making of ordnance, and hardness and tenacity combined with permanent elasticity can be given to it for the making of parts of machines, etc. In the elastic condition it is peculiarly well adapted for the bearings of machinery, since it produces very little friction. The addition of phosphorus has another important effect. When the proportion exceeds .5 per cent it gives a warmer color to the bronze, making it resemble gold largely alloyed with copper. This form of the alloy is therefore largely used for works of art. The name of steel-bronze is given to bronze condensed and hardened artificially, as in the making of cannon the bore of which is enlarged by forcing in several strong steel cylinders of different sizes in succession. Aluminum-bronze is a gold-colored alloy of copper and aluminum, manganese-bronze, a bronze containing manganese and iron, possessing valuable properties. See BRONZES.

Bronze Age, the period represented by archaeologists as intervening between the Stone Age and the Iron Age. The demarcations of these periods, however, are far from being clearly defined, and overlap to some extent. The use of stone for weapons, utensils, etc., naturally preceded the use of metals by primitive man, and the order in which the different metals would come into service would depend upon several factors. The nearness of the metallic deposits to the surface of the earth, the relative degree of purity in which they are usually found, and ease in smelting and working, would all affect the sequence of their introduction. The study of the traces of the Bronze Age in Europe apparently leads to the conclusion that throughout that continent the introduction of copper and its alloys was nearly synchronous, but the transition to the Iron Age took place more or less slowly in different regions, the new metal being introduced from the south and superseding bronze soonest where the paths of early commerce were most numerous or most frequently trodden. In Great Britain and Scandinavia the Bronze Age lingered much longer, according to certain archaeologists, than in Italy, France,

BRONZE WING—BROOK FARM

and Spain. In Greece, the use of bronze distinguishes the Mycenaean period, especially in its earlier days. In the New World, especially in Peru, the existence of the Bronze Age is indicated. The chronology of the three ages presents marked difficulties, and the periods should be regarded as stages of evolution in civilization still exemplified among races of slow development. The Bronze Age in Europe may be approximately placed between 2000 B.C. and 1800 B.C.

Bronze Wing, Bronzewing Pigeon, or Bronze Pigeon, any of several different species of the genus *Phaps*, found in Australia, Tasmania, and New South Wales. These are birds of beautiful plumage, obtaining their name from the lustrous bronze color with which the wings are variously marked. The most familiar species is the "common bronzewing" (*Phaps chalcoptera*), a plump, deliciously edible bird, weighing about a pound, and distributed throughout Australia. It nests on low branches on trees near swamps. The "brush bronzewing" (*P. elegans*) of southern Australia and Tasmania, is a groundkeeping bird and resembles a partridge in its habits. Another species is the "harlequin bronzewing" (*P. histrionica*), found in great flocks in the northwestern part of New South Wales. Sometimes the ground-pigeons of the genus *Geophaps* are called "bronzewings."

Bronzes, in archæology, works of art cast in bronze. Egyptian idols of bronze are contained in the British Museum. The most celebrated antique bronze statues are, the 'Sleeping Satyr'; the two youthful athletes; the colossal equestrian statue of Marcus Aurelius, at Rome; the Hercules of the capitol; the colossal head of Commodus; the statue of Septimius Severus in the Barberini Palace. Bas-reliefs, vaults, and doors of public edifices were ornamented with decorations of the same metal. Urban VIII. took from the Pantheon alone 450,000 pounds of bronze, which he used for the ornaments of St. Peter's, and for the cannon of the castle of St. Angelo. One of these was composed wholly of bronze nails taken from the portico, and bore the inscription, *Ex clavis trabalibus porticus Agrippæ*. Bronze was considered by the ancients as sacred to the gods; and the Roman emperors who struck gold and silver coins could not strike them of bronze without the permission of the Senate; hence the inscription S. C. (*Senatus consulto*). The words *moneta sacra* are found only on bronze medals. All the instruments of sacrifice and sacred vessels of the ancients were of bronze. (For the method of casting in bronze among the ancients, see Winckelmann's 'History of Art,' book ii.) The moderns have also made much use of bronze, particularly for statues exposed to accidents or the influence of the atmosphere, and for casts of celebrated antiques. The molds are made on the pattern, of plaster and brick-dust. The parts are then covered on the inside with a coating of clay as thick as the bronze is intended to be. The mold is now closed and filled on its inside with a nucleus or core of plaster and brick-dust, mixed with water. When this is done the mold is opened, and the clay carefully removed. The mould, with its core, is then thoroughly dried, and the core secured in its position by bars of bronze, which pass into

it through the external part of the mold. The whole is then bound with iron hoops, and the melted bronze being poured in through an aperture left for the purpose fills the cavity previously occupied by the clay, and forms a metallic covering to the core. It is afterward made smooth by mechanical means.

Bronzing. Bronze of a good quality acquires by oxidization a fine green tint, called *patina antiqua*, or, by the Romans, *arugo*. Sal-ammoniac and salt of sorrel dissolved in vinegar, and applied with a soft rag or brush, will produce this result. The process must be repeated several times to have its full effect. The proportions given by Dr. Ure are three fourths of an ounce of sal-ammoniac and a drachm and a half of salt of sorrel to a quart of vinegar. Bronzing is also the process by which a body of plaster, wood, or metal is made to receive a bronze-like surface. Brass castings are bronzed by the application, after cleaning and brightening them, of vinegar and sal-ammoniac. A variety of liquid solutions are prepared for bronzing copper and other metals, in which verdigris, sal-ammoniac, salt of sorrel, cinnabar, alum, and common salt are employed. To bronze wood and other articles, waste gold-leaf, ground in with honey and washed, or mosaic gold ground with bone ashes, is applied, with size or oil varnish. Gypsum casts are bronzed with black-lead.

Bronzino, Agnolo, or Angilo, ăn'yō-lō, or ăn'jē-lō brōn-zē-nō, Italian painter of the Florentine school: b. Monticelli, near Florence, 1502; d. 1572. He was a pupil of Jacopo da Pontormo, and an admirer and imitator of Michael Angelo. One of his best paintings is a Christ in the church of Santa Croce, at Florence.

Brooch, an ornament worn on the dress, to which it is attached by a pin stuck through the fabric. Brooches are of great antiquity, and were formerly worn by men as well as women. They were used by both sexes among the Greeks and Romans, and also in the Middle Ages. Among the Highlanders of Scotland there are preserved, in several families, ancient brooches of rich workmanship and highly ornamented. Some of them are inscribed with characters to which particular virtues were attributed, and seem to have been used as a sort of amulet or talisman.

Brook Farm, a community organized in 1841 near West Roxbury, Mass. Under the leadership of George Ripley and his wife an association was formed with a few stockholders, and a farm of 200 acres was purchased. Among the members of this association were Nathaniel Hawthorne, Charles A. Dana, John S. Dwight, and George P. Bradford; other prominent people connected with Brook Farm were Ralph W. Emerson, Amos B. Alcott, Theodore Parker, George W. Curtis, and Margaret Fuller. The ideal of the association was to promote the reorganization of society in accordance with the principles of co-operation. The life of the community was very simple; every one had some share of the work to do, the rate of pay being practically the same for all kinds of work; and all had a share in the educational advantages and the social enjoyments. There were a number of industrial employments besides the tilling of the farm, and the surplus product was

MODERN BRONZE WORK.



BROOKE

sold to outsiders. The school was also an important feature, furnishing instruction in all grades, including college subjects; pupils outside the community were received on the payment of a small fee. In 1843 the association, coming under the influence of Albert Brisbane, adopted the organization of the phalanx according to the plan of Fourier, and established the three "primary departments" of agriculture, domestic industry, and mechanic arts; it became also a centre of the Fourierist propaganda. After this change the prosperity of Brook Farm declined rapidly; on 3 March 1846 the new building, the Phalanstery, was burned, and the association finally dissolved in October 1847.

Bibliography.—Codman, 'Brook Farm, Historic and Personal Memoirs'; Frothingham, 'Life of George Ripley'; Noyes, 'History of American Socialisms'; Swift, Lindsay, 'Brook Farm, Its Members, Scholars, and Visitors.'

Brooke, Francis Key, American Protestant Episcopal bishop: b. Gambier, Ohio, 2 Nov. 1852. He was graduated from Kenyon College in his native town in 1874, and entering the Episcopal ministry was successively rector in the Ohio towns of College Hill, Portsmouth, Piqua, and Sandusky; and in St. Louis, Mo.; and Atchison, Kan. In 1893 he was consecrated bishop of Oklahoma and Indian Territory.

Brooke, Henry, Irish dramatist and novelist: b. Rantavan, Ireland, about 1703; d. Burrator, Devonshire, 10 Oct. 1783. He was educated at Dublin University, and began to practice at the bar; but his taste was decided for poetry and general literature, and he came forward as an author by publishing a tragedy called 'Gustavus Vasa,' which was remarkably popular at the time, and was translated into French, though it is now almost forgotten. He wrote several other tragedies, and also several novels, one of which, the 'Fool of Quality,' possesses considerable merit, and was re-published with a preface by Rev. Charles Kingsley. The death of his wife, and the loss of a favorite child, completely broke his spirit, and he lived for a short time in a state of second childhood.

Brooke, Sir James, English rajah, celebrated as the Rajah of Sarawak: b. Bengal, 1803; d. Burrator, Devonshire, 11 June 1868. He was brought at an early age to England, and having completed his education there obtained a cadetship in the Indian army. He distinguished himself in the Burmese war (1826), and subsequently sailed to China. On this voyage there rose in his mind the idea of ridding the Eastern Archipelago from the scourge of piracy, and ameliorating the condition of the inhabitants. Having come into the possession of a large fortune by the death of his father, he bought one of the royal yachts, and set sail for the East (October 1838). Having directed his course to the island of Borneo, he found Muda Hassim, uncle of the king of Borneo, and Rajah of Sarawak, a district on the northwest coast of the island, engaged in suppressing a revolt. The rajah being hard pressed, agreed to make him his successor in return for his assistance. The offer was accepted, Brooke took command of the rajah's army, and speedily reduced the rebels to submission. Being now established in the government, and recognized as Rajah of Sarawak by the sultan of Borneo (1841), he endeavored to induce the Dyak na-

tives to abandon their irregular and piratical mode of life, and to turn themselves to agriculture and commerce. For this end he published a code of laws, establishing free trade and personal equality, and declaring piracy a crime punishable with death. His efforts were wonderfully successful. In conjunction with the British naval commanders he carried on war against the pirates with great vigor. A sum of money was paid by government for the head of each pirate, and under this system the Malay rovers were soon almost extirpated. On his return in 1847, Mr. Brooke was received with general favor, his position was recognized by the government, he received the honor of Knight Commander of the Bath, and was made governor of Labuan, an island near Sarawak which had been acquired by the British. After his return to Borneo he continued to labor as before for the extension of British influence. In 1850 he went as ambassador to Siam, and not long after gave up his post as governor of Labuan. On the outbreak of the war with China in 1857, his residence was suddenly attacked by about 4,000 Chinese, and he himself only escaped by swimming across the river. His adherents soon rallied, however, and at the head of a large body of Malays and Dyaks he drove the Chinese from Sarawak with the loss of half their number. In 1863 he finally returned to England, leaving the government in the hands of his nephew, Charles Brooke. Whatever may be thought of the policy of Sir James Brooke, there can be no doubt as to the benefits derived from it by the people of Sarawak. He established civilization and opened up a trade where previously they had scarcely any existence. Under his administration Sarawak increased from a village of 1,000 inhabitants to a town of 16,000, while the trade increased in the same proportion.

Brooke, John Rutter, American military officer: b. Pottsville, Pa., 21 July 1838. He entered the army as captain in a volunteer regiment on the breaking out of the Civil War in 1861, and resigned in February 1866, with the rank of brevet major-general. He became colonel in March 1879; brigadier-general, 6 April 1888 and major-general, 22 May 1897. After the declaration of war against Spain, he was placed in command of the 1st Provisional Army Corps, and subsequently distinguished himself in the campaign in Porto Rico, and was made a member of the joint military commission to arrange the cession of the island to the United States. On 13 Dec. 1898, he was appointed military and civil governor of Cuba, a post which he held till April 1900, when he was succeeded by Gen. Leonard Wood. On 10 May following, he succeeded Maj.-Gen. Wesley Merritt as commander of the Military Department of the East, with headquarters in New York.

Brooke, Stopford Augustus, English clergyman and author: b. Letterkenny, Donegal, Ireland, 14 Nov. 1832. After a brilliant course at Trinity College, Dublin, he was ordained in the Anglican Church in 1857. From that year till 1859 he officiated as curate of St. Matthew's, Marylebone (London); and in 1876, after having held various other clerical appointments, he became minister of Bedford Chapel, Bloomsbury, where he officiated till his retirement from regular ministerial work in 1894. In 1872 he

BROOKHAVEN — BROOKLYN

was appointed one of the chaplains-in-ordinary to the queen. Having become a Unitarian in his views, he left the Church of England in 1880, but till 1894 still continued to occupy the same pulpit, Bedford Chapel being private property. He has gained a high reputation as a preacher and writer on religious subjects, and also as a poet, but more especially as a literary critic and historian of English literature. His chief works are 'Life and Letters of the Late Frederick W. Robertson of Brighton' (1865); 'Christ in Modern Life' (1872); 'Theology in the English Poets' (1874); 'Primer of English Literature' (1876), an admirable little work; 'Riquet of the Tuft' (1880), a love drama; 'The Early Life of Jesus' (1888); 'Poems' (1888); 'History of Early English Literature: from Its Beginning to the Accession of Alfred' (1892), the only work in English treating adequately its special subject; 'Tennyson: His Art and Relations to Modern Life' (1894); 'The English Poets from Blake to Tennyson' (1894); 'Jesus and Modern Thought' (1894); 'The Old Testament and Modern Life' (1896); 'The Gospel of Joy' (1898); besides several volumes of sermons. His son, Stopford Wentworth Brooke, was pastor of the First (Unitarian) Church in Boston, Mass., 1886-98.

Brookhaven, Miss., a city and county-seat of Lincoln County; on the Illinois C. R.R.; 54 miles south by west of Jackson, the State capital. It is the seat of Whitworth Female College (Methodist), one of the most popular educational institutions in the South, and St. Francis School (Roman Catholic), and is the trade centre for a large farming, cotton, and yellow pine lumbering region. Pop. (1900) 2,678.

Brookings, S. D., a city and county-seat of Brookings County; on the Chicago & N. R.R.; 60 miles north of Sioux Falls. It is chiefly a dairying place; has electric lights, waterworks, and several mills; and is the seat of the State Agricultural College and of the United States Experiment Station. Pop. (1900) 2,346.

Brookite, a mineral only known in the form of orthorhombic crystals. It is an oxid of titanium, having the formula TiO_2 . It is found in a variety of colors, mostly in shades of brown. It has a hardness of 5.5 to 6.0, and a specific gravity of 3.9 or 4.0. It occurs in Switzerland, in the Tyrol, and in Wales. In the United States it is found (in the form of a variety known as "arkansite") at Magnet Cove, Ark.; also at Paris, Maine, in Ulster County, N. Y., and in North Carolina. The mineral was named for the English mineralogist, H. J. Brooke.

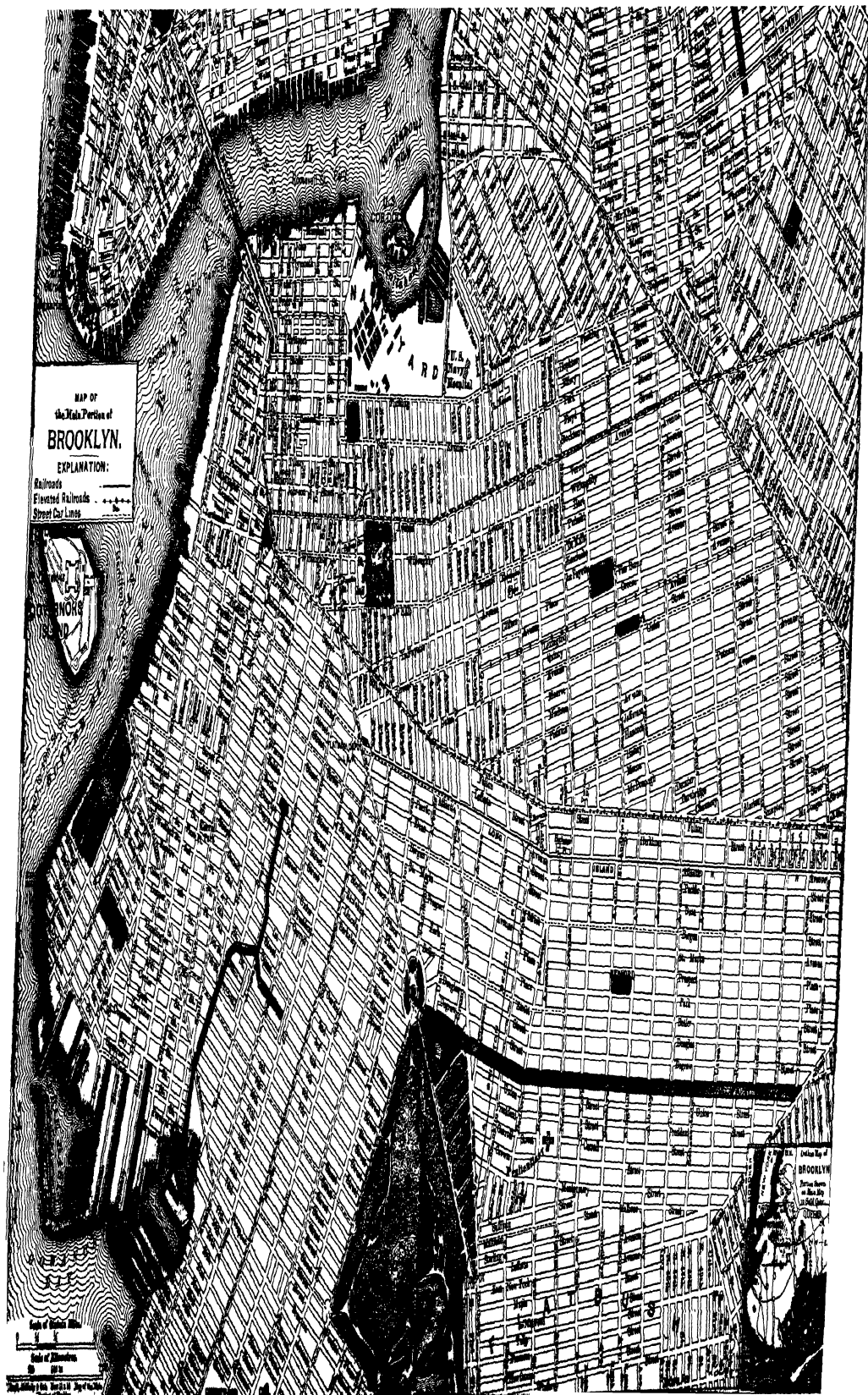
Brooklime (*Veronica Beccabunga*, and *V. americana*), two species of speedwell, perennial plants of the natural order *Scrophulariaceæ* common in ditches and wet places in Europe and America respectively, and attractive for their axillary racemes of bluish flowers, for which they are grown in damp places for ornamental purposes.

Brookline, Mass., a town in Norfolk County, on the Charles River, and the Boston & A. R.R.; three miles west of Boston, with which it is connected by electric railroad. It contains the villages of Cottage Farm, Longwood, and Reservoir Station; has a granite town house,

public library, and manufactories of electric motors, and philosophical instruments, but is chiefly a place of suburban residence, being one of the most beautiful and wealthy suburban towns in the country. It was first settled in 1635, and was known as "the hamlet of Muddy River" until its incorporation as Brookline in 1705. See Bolton, 'Brookline: the History of a Favored Town' (1897). Pop. (1900) 19,935.

Brooklyn, N. Y., the second largest of the five boroughs of New York city. It includes the entire area of the county of Kings and was, until 1898, when it was consolidated with New York, the fourth largest city in point of population in the United States. It covers the western extremity of Long Island, is situated in lat. $40^{\circ} 41' 50''$ N., lon. $73^{\circ} 59' 50''$ W., and has an area of 77.52 square miles, extending from the East River, an arm of the sea which separates it from the borough of Manhattan, the old city of New York, to the Atlantic Ocean and to Newtown Creek and Queens County on the east. Its extreme length from Newtown Creek to Brighton Beach, on the Atlantic shore, is 11 miles, and its average width is over 7 miles. It appears to have been formed by nature to be the site of a great city, for so many natural advantages are rarely to be found within a similar area for the building up of a great industrial and commercial community. The island of Manhattan is the centre of the business activity of the American metropolis, and it may retain that primacy for all time, but its restricted area limits its capacity and forbids its expansion. The tendency has been for some years to expand skyward and to utilize to the utmost the ground area of the island by the erection of lofty buildings, many of them exceeding 20 stories in height, but there is a limit to expansion in this direction, and there seems no possibility of adding to the amount of Manhattan waterfront available for purposes of commerce, while the high price of land caused by the imperious demands of trade compels those engaged in business in Manhattan to seek their homes elsewhere. Brooklyn has profited during the greater part of its history from this compulsion, and its population has increased at a constantly accelerated ratio as the demands of business have made property more valuable in the older portion of the city. Since 1860 Brooklyn has advanced in population more rapidly than any other American city, although the period of its most rapid growth dates from the opening of the first bridge across the East River in 1883. Brooklyn's large territorial area, much of which is still devoted to market gardening, must, for many years to come, keep the cost of a home within the resources of people of moderate means, especially as regards the outlying sections, which are thoroughly covered by electric railways. The character of the soil and the freedom from any rocky hills makes nearly every foot of ground admirably suited to building purposes. The greater part of the borough is situated at a considerable elevation above tide-water. A low range of sand-hills, from 50 to 200 feet high, runs north and east through its centre, which slopes gently down on both sides to the East River and the Atlantic Ocean.

The natural configuration of the site simplifies drainage and other similar municipal problems to a material extent, while the loca-



MAP OF
the Main Portion of
BROOKLYN.

EXPLANATION:

Railroads
Electric Railroads
Street Car Lines

CONEY ISLAND

Scale of Statute Miles

Scale of Kilometers

1910

Published by the United States
Geographical Society

Outline Map of
BROOKLYN
Portion North
of New City
Hall

BROOKLYN

tion of the borough, between ocean, river, and bay, mitigates the extremes of winter cold and summer heat, and makes it a desirable place of residence throughout the year.

Its advantages as a centre of commerce and industry are no less than those which made it famous as a city of homes before its consolidation with the metropolis. Its water-front available for shipping comprises two miles on Newtown Creek, including its basins, and nearly 10 miles on the East River and New York Bay. The construction of large docks, such as those of the Atlantic and Erie basins—the latter being the chief point of entry of the canal barges that bring great cargoes of grain from the distributing centre at Buffalo to the Brooklyn grain-elevators—have largely increased the wharfage facilities of the borough.

Most large cities grow by the absorption of outlying suburbs and adjacent villages, and in this respect the experience of Brooklyn has been striking. The name of Brooklyn, which was derived from the town of Breucklen, in Holland, the home from which came most of the earliest settlers, was first attached to a small trading-village that grew up on the shores of the East River near what is now the Fulton ferry to Manhattan. There were several other villages in the county which for a long time retained their individuality and developed along their own lines. Across the Wallabout swamp, to the eastward—"Wallabout" being derived from a settlement of Walloons—a village was laid out in 1827 which was incorporated under the name of Williamsburg and in 1851 became incorporated as a city. Then Williamsburg swallowed up the older and adjacent villages of Bushwick and Greenpoint, just as Brooklyn had already swallowed up Bedford and Gowanus. In 1854 Brooklyn and Williamsburg were consolidated. The town of New Lots, including the village of East New York, came next, and the work of absorption, as far as Brooklyn was concerned, was completed in 1864, when the towns of Flatbush, New Utrecht, Gravesend, and Flatlands were made part of the city, the corporate limits of which then included all of Kings County. It was a natural process, but usually, when a large city is surrounded by suburbs that are destined to absorption, the lines of development of the suburbs are indicated and set in accordance with their inevitable destiny, and annexation entails no confusion. It was different with Brooklyn. Williamsburg, Flatbush, Canarsie, Bushwick, and East New York—more than 20 villages and hamlets all told, that are now a part of the borough of Brooklyn—had each its own plan and its own system of nomenclature. The result has been hopeless and to a large extent irremediable confusion. Duplication of street names may be corrected by the substitution of new names for the old, and much has already been done in that direction, but the confusion resulting from the multiplicity of independent plans on which the various parts of the borough were originally laid out have never been wholly corrected, and Brooklyn will continue to be a puzzle to strangers and even to old residents.

It is as a city of homes—of middle-class homes—that Brooklyn has gained its distinctive character among American cities. The

very wealthy can afford to live in Manhattan, and the very poor have no alternative but to crowd into its hive-like tenements, but it may be said that, as a rule, the palace and the tenement—using the latter word in its ordinary, not its technical sense—are alike unknown in Brooklyn. No place of like population is freer from those congregations and nurseries of crime and disease known as "slums," and in no city is a larger proportion of the population housed under decent and sanitary conditions. It is for this reason, and because the growth of Brooklyn has kept pace in other respects with its growth in numbers, that the population increased from 279,122 in 1860 to 599,495 in 1880; 1,166,582 in 1900, and 1,291,597 in 1903.

The earliest settlement of the Dutch in Kings County was made in 1619, but it was not until more than a century later that Brooklyn had any organized existence. It was the scene of Washington's first battle and defeat during the American Revolution. That battle was fought only about six weeks after the American Congress in Philadelphia had adopted the Declaration of Independence. Washington's army, as yet raw and totally unused to warfare, was massed among Brooklyn's hills, while Gen. Howe, with 30,000 seasoned fighting men, occupied Staten Island. The British crossed to Long Island, landing on the plains of New Utrecht, and on the morning of 27 Aug. 1776, a general advance was made on the American lines. The attack was made at three points. One division advanced through the marshes of Gowanus, and, despite a gallant resistance, drove back the Maryland regiment to the main body of American troops. A second point of attack was through what is now known as Battle Pass, in Prospect Park, where the Americans were forced back on the entrenched position at Fort Green, but the heaviest blow was struck through the advance of a strong flanking party. It had early that morning passed along the northern base of the ridge of hills in what is now the Twenty-fourth ward, stopping at the Howard House, a tavern in East New York, and impressing its owner as a guide. It then advanced upon Washington's forces from the east. A misty night fell, with no general engagement, and by morning Washington had withdrawn his troops, under cover of fog, across the East River. The British retained possession of Brooklyn until the evacuation of New York at the close of the war. Brooklyn's most memorable association with Revolutionary history, however, lies in the fact that the British prison ships—the Jersey and its consorts—were moored in Wallabout Bay, and the bones of 11,000 victims of British severity who died in those floating slaughter-pens are buried at Fort Green, where a worthy monument to their patriotic devotion is soon to be erected.

Brooklyn was incorporated as a village in 1801, and at about that time the federal government made its first purchase of land at the Wallabout for navy-yard purposes. The Brooklyn navy yard is now the best equipped in the possession of the U. S. government. It covers an area of over 100 acres, with a capacious dry-dock, and a mechanical plant capable of ship-building on the most extensive scale. Some of the finest ships in the United States navy have been constructed here, and its great repair shops

BROOKLYN

are kept constantly at work. A splendidly equipped naval hospital occupies a fine site in connection with the yard.

Brooklyn village was incorporated as a city in 1834, with George Hall as its first mayor. In 1854 came consolidation with Williamsburg, and thereafter the growth of the city was steady and rapid. Street railway enterprises opened highways through outlying farm districts, and these speedily became transformed into great thoroughfares, and Brooklyn has now 713 miles of streets, of which the principal ones are paved with asphalt.

The surface and elevated railroad lines, all operated by electricity, have 549.7 miles of tracks, and in 1902 carried 324,898,322 passengers. The growth of Brooklyn, so largely accelerated by the bridge opened in 1883, seems likely to be further stimulated by the early completion of the two additional bridges now in course of construction. The tunneling of the East River, under direction of the New York Rapid Transit Commission, will also tend materially toward Brooklyn's further growth.

It has been generally assumed that Brooklyn is merely "the sleeping-place of Manhattan." It is undoubtedly true that many thousands of those who are engaged in business in Manhattan find their homes in Brooklyn,—the number has been estimated at between 65,000 and 100,000; but the fact remains that Brooklyn itself is one of the greatest manufacturing centres of the United States. In many important branches of industry it leads all its competitors. Its most important industry, at the time of the last census, was foundry and machine-shop products, in which there was \$13,725,518 invested, and wages to the amount of \$5,641,132 were paid to 7,753 workmen. Brooklyn's sugar-refining industry is by far the most important in the United States, nine tenths of the sugar consumed in the country being refined here. In this and in the closely allied coffee-roasting industry, the amount of capital invested is nearly \$20,000,000, the annual value of the finished product being, sugar, \$16,629,982; coffee, \$12,247,162. The manufacture of chemicals is another industry in which much capital is invested, and in which 2,984 people find employment. Some of the leading publishers of the United States have located their printing and bookbinding establishments in Brooklyn. It is also the seat of jute manufacture, glass and porcelain factories cordage works, and other important industries.

Brooklyn's public-school system, up to the date of consolidation with New York, held a high place in the esteem of public educators. In 1897 it was merged in the public-school system of the greater city, but it still possesses many of the characteristics that formerly distinguished it, and few if any cities in the world have a better equipped galaxy of public schools. It has six high schools, of which one is devoted to manual and technical instruction, while another is wholly given over to commercial instruction. Its 133 grammar schools are crowded almost beyond their capacity every day in the school year. Many of the schools in the poorer neighborhoods are kept open during the summer months as recreation schools for the benefit of children who remain in the borough during the ordinary school vacation, and who

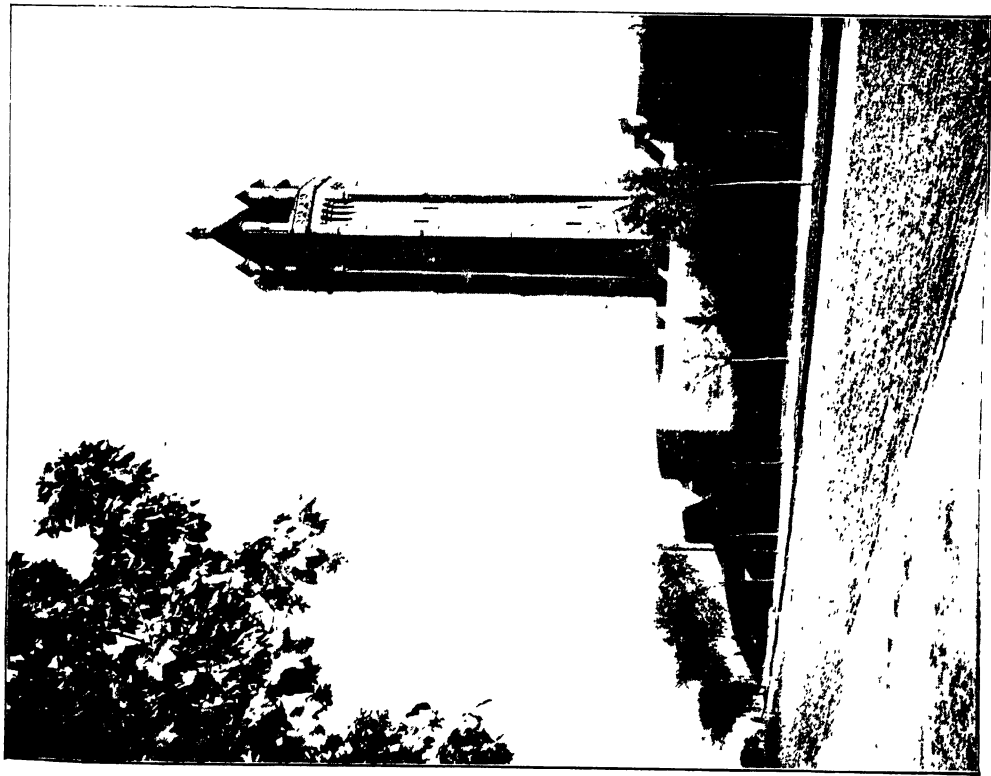
are taught many things outside of the ordinary school curriculum.

Brooklyn has no university, but it has many excellent private schools and academies, some of which, such as the Polytechnic Institute, Adelphi Academy, and St. John's College, hold collegiate rank and may grant degrees. The parochial schools also hold high rank, while the Pratt Institute affords thorough technical training to hundreds of pupils.

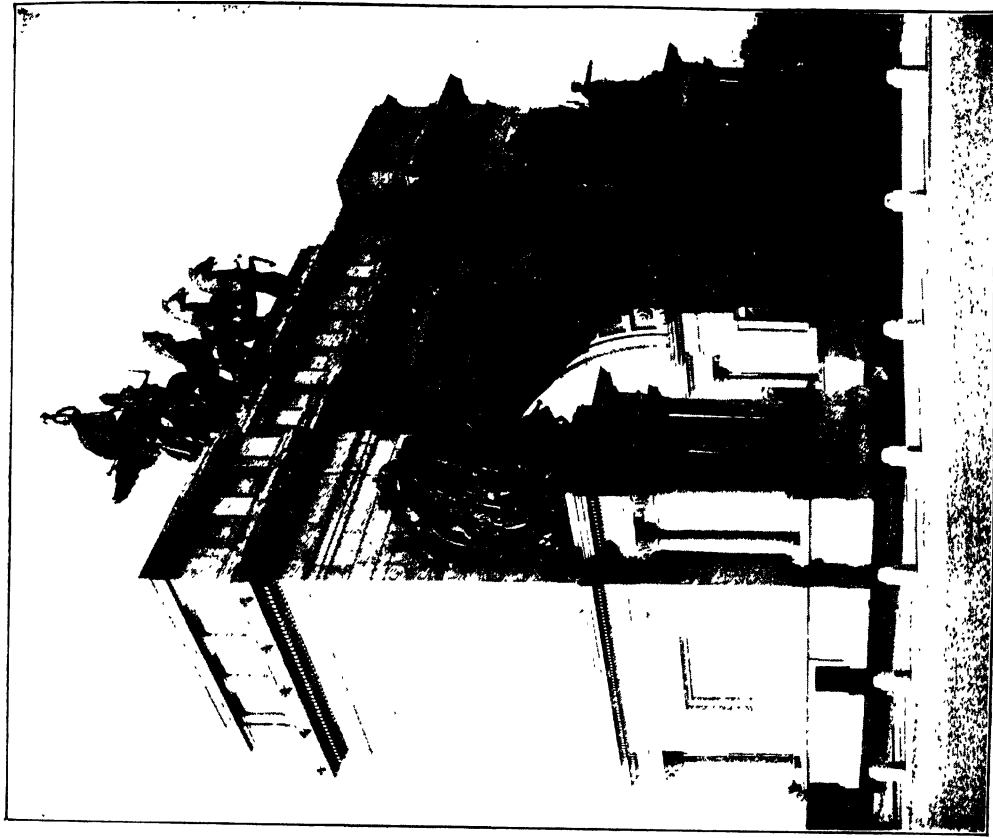
The Brooklyn Public Library, with which the excellent Brooklyn Library has recently been incorporated, maintains an extensive system of branch libraries throughout the borough; and when this is supplemented by the system of libraries recently presented by Mr. Andrew Carnegie, no community in the United States will be better equipped in this direction.

One of the most notable of the educational institutions in Brooklyn is the Brooklyn Institute of Arts and Sciences. This valuable and practically unendowed institution is, as regards its present buildings, situated upon high ground adjacent to Prospect Park, on what is known as the East Side Park lands, of which 117 $\frac{1}{2}$ acres have been leased to the trustees for 100 years. It is the development of a school of arts and sciences founded during the middle of the 19th century by Augustus Graham, a philanthropist of English extraction. It has expanded under the direction of Prof. Franklin W. Hooper and a public-spirited board of trustees into what is likely to prove the nucleus of a great national academy. It already has a well-furnished museum, which is especially rich in prehistoric American relics, and departments of archaeology, architecture, astronomy, botany, chemistry, domestic science, electricity, engineering, entomology, geography, geology, law, mathematics, microscopy, mineralogy, music, painting, pedagogy, philology, philosophy, photography, physics, political science, and psychology, each of which is presided over by an expert in the science. Only the first section of the museum building has as yet been erected, but when completed the entire structure will cover a large area, with four interior courts to provide light for the central portions of the building. It will contain on the first floor rooms for collections illustrating the general history of the arts and architecture; on the second floor rooms for the illustration of the practical arts and sciences; and on the third floor galleries for the illustration of the history of painting, engraving, etching, and decorative art. It is expected that before long the splendid library of the Long Island Historical Society will find accommodations within the museum building.

Brooklyn's public park system has been developed on a scale altogether commensurate with the character of the borough, and full advantage has been taken of the cheapness of land to make provision for the needs of the future in the matter of breathing places and pleasure grounds. The oldest and best known, although not the largest of these, is Prospect Park, which includes 516 acres of rolling land, with picturesque lakes and an unrivaled growth of old forest trees. Prospect Park is beautifully laid out, special care having been taken during the 40 years of its existence as a park to preserve its natural characteristics. Its statuary includes figures of J. S. T. Stranahan, one of the pioneers in the matter of providing public



WATER TOWER AND ENTRANCE TO PROSPECT PARK.



MEMORIAL ARCH, PLAZA ENTRANCE TO PROSPECT PARK.

BROOKS

parks; John Howard Payne, Thomas Moore, Washington Irving, Beethoven, and Mozart. There is also, at the foot of Lookout Hill, a memorial shaft in honor of the Maryland soldiers who fell in the battle of Long Island.

Another notable pleasure ground is Brooklyn Forest, which includes 536 acres on the crown of the ridge of hills on the Queens County border. Except for the laying out of walks and paths it has been left in its natural state. It affords splendid views of the Atlantic Ocean and Jamaica Bay, Sunset Park, a reserve of 14 acres on the shores of New York Bay, and the Coney Island Concourse, which runs along the Atlantic shore and contains 70 acres, are unique in their location. In addition there are nearly 40 small parks and recreation grounds in the borough. The system of parkways and boulevards under the care of the park department covers 42 miles of well-paved roadways, to which additions are constantly being made.

W. C. BRYANT,
Editor Brooklyn Times.

Brooks, Charles William Shirley, English journalist, editor of 'Punch': b. London, 29 April 1816; d. there, 23 Feb. 1874. He settled in London, wrote dramas, contributed to the leading periodicals and journals, and for five sessions wrote the 'Parliamentary Summary' for the *Morning Chronicle*. By its proprietors he was sent, in 1853, on a mission to report on the condition of labor and the poor in Russia, Syria, and Egypt, and a result of his observations appeared in 'The Russians of the South' (1856). He wrote political articles, attracted attention by several dramas and burlesques, and in 1854 joined the staff of the London 'Punch.' In 1870 he succeeded Mark Lemon as its editor. His novels, which include 'Aspen Court' (1855); 'The Gordian Knot' (1860); 'The Silver Cord' (1861); 'Sooner or Later,' with illustrations by Du Maurier (1866-8); 'The Naggeltons' (1875), show keen observation. He also wrote 'Amusing Poetry' (1857). His son, REGINALD SHIRLEY, collected Brook's 'Wit and Humor from Punch' (1875).

Brooks, Elbridge Gerry, American Universalist clergyman: b. Dover, N. H., 29 July 1816; d. Philadelphia, Pa., 8 April 1878. His first pastorate was at West Amesbury, Mass., in 1837, and he was subsequently in charge of churches at East Cambridge, Mass., Lowell, Mass., Lynn, Mass., New York, and Philadelphia.

Brooks, Elbridge Streeter, American author, son of Elbridge Gerry Brooks (q.v.): b. Lowell, Mass., 14 April 1846; d. Somerville, Mass., 7 Jan. 1902. He was the author of more than 40 books for young people, intended to familiarize them with American history, among which are 'Historic Boys'; 'Chivalric Days'; 'The Story of the American Indian'; 'The Story of New York'; 'Heroic Happenings' (1893); 'The True Story of George Washington' (1895); 'The Century Book of Famous Americans' (1896); 'Stories of the Old Bay State' (1899); 'A Godson of Lafayette' (1900); 'Under the Allied Flags' (1901). He edited the 'Wide Awake Magazine' for several years, and was the literary adviser of the Boston publishing house of D. Lathrop Company from 1895 until his death.

Brooks, James Gordon, American poet: b. Claverack, N. Y., 3 Sept. 1801; d. Albany, 20 Feb. 1841. He studied law, and removed in 1823 to New York, where he became editor of the 'Minerva,' a literary journal, and afterward of the 'Literary Gazette,' the 'Athenæum,' and the *Morning Courier*, continuing in all these papers the publication of his verses. In 1828 he married Mary Elizabeth Aikin, who had written under the signature of Norma, and the next year appeared the 'Rivals of Este, and Other Poems,' by James G. and Mary E. Brooks.

Brooks, John, American soldier, and governor of Massachusetts: b. Medford, 1752; d. 1 March 1825. While pursuing the study of medicine he displayed a love for military exercises, and having settled as a medical practitioner at Reading undertook the drilling of a company of minute men, with whom, on the news of the expedition to Lexington, he marched in time to see the retreat of the British. Promoted soon after to the rank of major in the Continental service, he assisted in throwing up the fortifications on Breed's Hill, and was especially serviceable to the army as a tactician. He was made lieutenant-colonel in 1777, and in the battle of Saratoga stormed the intrenchments of the German troops. He was a faithful adherent of the commander-in-chief during the conspiracy at Newburg. Washington requesting him to keep his officers within quarters, that they might not attend the insurgent meeting, his reply was: "Sir, I have anticipated your wishes, and my orders are given." Washington took him by the hand, and said: "Col. Brooks, this is just what I expected from you." After the peace he resumed the practice of the medical profession in Medford, and was for many years major-general of the militia of his county. In the War of 1812 he was adjutant-general of Massachusetts, and in 1816 was elected governor of that State, an office to which he was re-elected annually till 1823, when he declined being again a candidate.

Brooks, John Graham, American lecturer on economics: b. Acworth, N. H., 19 July 1846. He was graduated from the Harvard Divinity School in 1875, and subsequently studied in the universities of Berlin, Jena, and Freiburg. He was for a time in the work of the Unitarian ministry, and was for several years a lecturer in the extension department of the University of Chicago. For two years he served as an expert in the department of labor at Washington, making a report in 1893 upon workmen's insurance in Germany. He has published 'Charity and the Unemployed'; 'The Pope and the Encyclical on Labor'; 'The Social Unrest' (1903).

Brooks, Maria Gowan, (MARIA DEL OCCIDENTE), American poet: b. Medford, Mass., about 1795; d. Matanzas, Cuba, 11 Nov. 1845. She spent her youth in Charlestown, Mass., and the rest of her life in London, New York, and Cuba. Her chief poem is 'Zophiel, or the Bride of Seven,' the first canto of which appeared in Boston in 1825, and the rest was finished under Southey's supervision in 1833. 'Idomen, or the Vale of Yumuri,' is an autobiography (1843).

Brooks, Noah, American journalist and author: b. Castine, Maine, 30 Oct. 1830; d. Los Angeles, Cal., 16 Aug. 1903. Since 1850 he has been connected with newspapers in Massachusetts, California, Washington, and New York.

BROOKS

He has written many popular books for boys, among which are 'The Fairport Nine' (1880); 'Our Baseball Club' (1884); 'How the Republic is Governed'; 'American Statesmen' (1893) 'Short Stories in American Party Politics' (1896); 'The Boys of Fairport'; 'The Mediterranean Trip.'

Brooks, Peter Chardon, American merchant: b. Medford, Mass., 6 Jan. 1767; d. Boston, 1 Jan. 1849. He began his business career as secretary in a marine insurance office in Boston, and presently became its principal. He rapidly acquired a fortune, retiring in 1803, and for the remainder of his life took an active interest in municipal and philanthropic affairs. He was the president of several benevolent associations, a member of the first city council of Boston, and sat in both houses of the State legislature. He was one of the most prominent opponents of the lottery schemes then countenanced by many respectable persons. One of his daughters married Rev. H. L. Frothingham (q.v.), and several prominent Boston families of to-day claim him as an ancestor. See Everett, 'Life of Peter C. Brooks.'

Brooks, Phillips, American Protestant Episcopal bishop: b. Boston, Mass., 13 Dec. 1835; d. there, 23 Jan. 1893. He inherited the best traditions of New England history, being on the paternal side the direct descendant of John Cotton, and his mother's name, Phillips, standing for high learning and distinction in the Congregational Church. Born at a time when the orthodox faith was fighting its bitterest battle with Unitarianism, his parents accepted the dogmas of the new theology, and had him baptized by a Unitarian clergyman. But while refusing certain dogmas of the orthodox Church they were the more thrown back for spiritual support upon the internal evidences of evangelical Christianity. Transition to the Episcopal Church was easy; the mother became an Episcopalian, and the future bishop received all his early training in that communion. But heredity had its influence, and in after life he declared that the Episcopal Church could reap the fruits of the long and bitter controversy which divided the New England Church only as it discerned the spiritual worth of Puritanism, and the value of its contributions to the history of religious thought and character. Such were the early surroundings of the man, and the subsequent influences of his life tended to foster this liberal spirit. When he entered Harvard, he came into an atmosphere of intense intellectual activity. James Walker was the president of the college, and Lowell, Holmes, Agassiz, and Longfellow were among the professors. He graduated with honor in 1855, and soon after entered the Episcopal Theological Seminary at Alexandria, Va. The transition from Harvard to this college was an abrupt one. The standards of the North and South were radically different. The theology of the Church in Virginia, while tolerant to that of other denominations, was uncompromisingly hostile to what it regarded as heterodox.

When the Civil War was declared he threw himself passionately into the cause of the Union. Yet his affection for his Southern classmates, men from whom he so widely differed, broadened that charity that was one of his finest characteristics, a charity that respected conviction wher-

ever found. No man, in truth, ever did so much to remove prejudice against a Church that had never been popular in New England. To the old Puritan dislike of Episcopacy and distrust of the English Church as that of the oppressors of the colony, was added a sense of resentment toward its sacerdotal claims and its assumption of ecclesiastical supremacy. But he nevertheless protested against the claim by his own communion to the title of "The American Church," he preached occasionally in other pulpits, he even had among his audiences clergymen of other denominations, and he was able to reconcile men of different creeds into concord on what is essential in all. The breadth and depth of his teaching attracted so large a following that he increased the strength of the Episcopal Church in America far more than he could have done by carrying on an active propaganda in its behalf. His first charge was the Church of the Advent, in Philadelphia; in two years he became rector of Holy Trinity Church in the same city. In 1869 he was called to Trinity Church, Boston, of which he was rector until his election as bishop of Massachusetts in 1891.

It is impossible to give an idea of Phillips Brooks without a word about his personality, which was almost contradictory. His commanding figure, his wit, the charm of his conversation, and a certain boyish gayety and naturalness, drew people to him as to a powerful magnet. He was one of the best-known men in America; people pointed him out to strangers in his own city as they pointed out the Common and the Bunker Hill monument. When he went to England, where he preached before the queen, men and women of all classes greeted him as a friend. They thronged the churches where he preached, not only to hear him but to see him. It was said of him that as soon as he entered a pulpit he was absolutely impersonal. There was no trace of individual experience or theological conflict by which he might be labeled. He was simply a messenger of the truth as he held it, a mouthpiece of the Gospel as he believed it had been delivered to him. Although in his seminary days his sermons were described as vague and unpractical, he was as great a preacher when under 30 years of age as at any later time. His early sermons, delivered to his first charge in Philadelphia, displayed the same individuality, the same force and completeness and clearness of construction, the same deep, strong undertone of religious thought, as his great discourses preached in Westminster Abbey six months before his death. His sentences are sonorous; his style was characterized by a noble simplicity, impressive, but without a touch showing that dramatic effect was strained for. He passionately loved nature in all her aspects, and traveled widely in search of the picturesque; but used his experience with reserve, and his illustrations are used to explain human life. His treatment of Bible narratives is not a translation into the modern manner, nor is it an adaptation, but a poetical rendering, in which the flavor of the original is not lost though the lesson is made contemporary. He used figures of speech and drew freely on history and art for illustrations, but not so much to elucidate his subject as to ornament it. As might be expected of one who, in the world's best sense, was so thoroughly a man, he had great influence with young men and was one of the

most popular of Harvard preachers. It was his custom for 30 alternate years to go abroad in the summer, and there, as in America, he was regarded as a great pulpit orator. He took a large view of social questions, and was in sympathy with all great popular movements. His advancement to the episcopate was warmly welcomed by all parties, except one branch of his own church with which his principles were at variance, and every denomination delighted in his elevation as if he were the peculiar property of each. His works include 'Lectures on Preaching' (1877); 'Sermons' (1878-81); 'Bohlen Lectures' (1879); 'Baptism and Confirmation' (1880); 'Sermons Preached in English Churches' (1883); 'The Oldest Schools in America' (Bos. 1885); 'Twenty Sermons' (N. Y. 1886); 'Tolerance' (1887); 'The Light of the World, and Other Sermons' (1890); and 'Essays and Addresses' (1894). His 'Letters of Travel' show him to have been an accurate observer, with a large fund of spontaneous humor. See Allen, 'Life and Letters of Phillips Brooks'; Howe, 'Phillips Brooks' (1902).

Brooks, Preston Smith, American politician and legislator: b. Edgefield, S. C., 4 Aug. 1819; d. Washington, D. C., 27 Jan. 1857. He was graduated at South Carolina College in 1839; elected to the legislature of his native State in 1844; raised a company for the Mexican war and led it as captain in the famous Palmetto regiment. He was sent to Congress in 1853, made his first speech in February 1854, on the subject of the Nebraska bill; speaking also in June of the same year on the Pacific railroad bill. On 22 May 1856, Senator Sumner, of Massachusetts, having employed in a speech in the Senate various expressions which had greatly incensed the members of Congress from South Carolina, Brooks entered the Senate chamber, after the Senate had adjourned, while Sumner was seated at his desk engaged in writing, and with blows on the head from a gutta-percha cane struck the Senator to the floor, where he left him insensible. On 2 June a committee of the House of Representatives reported in favor of Mr. Brooks' expulsion. In the final action upon the report there were 121 votes in favor of and 95 opposed to it, which, being less than the requisite two thirds vote, prevented the House from agreeing to the resolution. Mr. Brooks, however, resigned his seat, and, 8 July, pleaded guilty before the court at Washington upon an indictment for assault, and was sentenced to a fine of \$300. Having addressed his constituents on the subject of the assault, he was re-elected to Congress by a unanimous vote, and made, on 7 Jan. 1857, a second speech on the Nebraska bill.

Brooks, Shirley. See BROOKS, CHARLES WILLIAM SHIRLEY.

Brooks, William Keith, American zoologist: b. Cleveland, Ohio, 25 March 1848. He has been a professor of zoology in Johns Hopkins University from 1876. Among his published books are 'Handbook of Invertebrate Zoology' (1882); 'Heredity' (1884); 'The Development and Protection of the Oyster in Maryland' (1884); 'A Monograph of the Genus *Salpa*' (1893); 'Foundation of Zoology' (1898).

Brooks, William Robert, American astronomer: b. Maidstone, Kent, England, 11 June 1844. He was educated in the United States,

and in 1874 founded the Red House Observatory at Phelps, N. Y., where he discovered 11 comets. Since 1888 he has been in charge of the Smith Observatory at Geneva, N. Y., where he has discovered 12 more comets. In 1887 he was elected a Fellow of the Royal Astronomical Society of Great Britain.

Brooks of Sheffield, a fictitious personage alluded to in Dickens' 'David Copperfield.'

Brooks's, a noted London Club founded in 1764. It was originally a sporting establishment, managed by Almack, and its second proprietor was named Brooks, the club subsequently taking its name from him. It is situated at No. 60 Saint James Street, and is political in character.

Broom, various shrubs of the closely allied genera *Genista*, *Cytisus*, and *Spartium*, of the natural order *Leguminosae*, natives mostly of the warm and temperate parts of the Old World. The name is not applied to species which do not have the long, slender twigs, but is restricted to those characterized by these slender branches and numerous axillary flowers. *Genista monosperma* (*Spartium monospermum* of some botanists), a Spanish and north African species, attains a height of 10 feet; has almost leafless, grayish branches; small, simple, linear, silky leaves; fragrant white flowers in short lateral racemes; and one-seeded pods. It is planted in shrubberies and is grown in greenhouses in preferably loose, dry soil. *G. tinctoria*, dyer's greenweed, a native of Europe and western Asia, is an erect shrub about three feet tall with somewhat pubescent branches and many flowered axillary racemes which are terminally panicle. Its branches, leaves, and blossoms are used to dye wool yellow, or, when mixed with wood, green. *Cytisus scoparius*, Scotch or common broom, a native of middle and southern Europe, attains a height of 20 feet, but usually much less, has erect, slender branches, short petioled leaves, generally large, solitary, long-stalked, drooping yellow flowers and brownish black pods. It has been largely introduced into the United States for ornament, and is hardy almost as far north as Washington. It succeeds on dry soils, and produces an abundance of bloom in late spring and early summer. The stems and leaves, which are very bitter and nauseous tasting and smelling, have been used in dyeing and tanning, and the fibre of the former used to make cloth and paper. The wood of large specimens is highly valued for turning and cabinetmaking. *C. albus*, white or Portugal broom, a native of the Mediterranean region, which attains a height of three feet, sometimes even 20 feet, has fascicles of axillary flowers, for which it is frequently planted in shrubberies. Many other species are valued for ornamental planting, for pasturage, and since their flowers yield abundant nectar, for bee forage. *Spartium junceum*, Spanish broom, a native of southern Europe, is an upright shrub, 10 feet tall, with slender, green branches, fragrant yellow flowers which appear continuously during summer, and in California where the plant has been introduced, almost throughout the year. It grows on dry soils and in rocky places. Its fibre is used to some extent in Spain, Italy, and France for rope- and cloth-making, and even for making some kinds of lace. See CYTISUS; GENISTA; SPARTIUM.

BROOM-CORN — BROUGH

Broom-corn, (1) (*Sorghum vulgare*, millet or Guinea-corn), a plant of the order of grasses, with a jointed stem, rising to the height of 8 or 10 feet, extensively cultivated in North America, where the branched panicles are made into carpet-brooms and clothes-brushes. The seed is used for feeding poultry, cattle, etc. (2) *Sorghum saccharata*, from which a kind of syrup or molasses is made.

Broom Rape (*Orobancha ramosa*), an annual parasitic plant of the natural order *Orobanchaceæ*, a native of Europe but established in America, especially in tobacco and hemp fields, where it often does great damage by sucking the juices of the plants which it eventually kills. Its slender, brownish or straw-colored stems attain a height of 6 to 15 inches, bear small scales instead of leaves, and light blue sessile flowers, followed by an abundance of minute seeds which rapidly spread the pest. Clean seed, clean cultivation and change of crops upon the land for several years are the only safeguards and remedies.

Broom-sedge. See ANDROPOGON.

Brooms and Brushes, Manufacture of, in the United States. Europeans use to this day a broom made from hickory withes for rough sweeping, and the long-haired brush for housework, and it was not until about 1850 that Americans discovered the valuable properties of a variety of the indigenous Indian maize for broom making. The industry was for a time carried on in a desultory way, but the first factory established for the manufacture of brooms from corn was opened in 1859, by Ebenezer Howard, at Fort Hunter, Montgomery County, N. Y. Factories were also soon started in Fort Hunter by John D. Blood, who formed the firm of Blood & Herrick, and by Ebenezer Howard, who formed that of Howard & Bronson. All of the broom factories established at Fort Hunter have since become absorbed by the American Broom and Brush Company, and all are in operation to-day. The broom and whisk-broom industry is now carried on in the Eastern States almost entirely by the American Broom and Brush Company, which, besides the factories named, also have works at Buffalo, N. Y., Dallas, Pa., Baltimore, Md., and Richmond, Va. The business in the Western States is in the hands of the Cupples Woodenware Company, of St. Louis, and Rosebloom & Company, of Chicago. In 1880 there were in the United States 980 establishments for the manufacture of brooms and brushes, with a capital of \$4,186,897, and a product valued at \$10,560,855. In 1900 there were reported 1,526 establishments, with a capital of \$9,616,780, and a product valued at \$18,490,847. Many brooms are made by hand in various penitentiaries throughout the country. There are also many brooms made in blind asylums, as the work is found especially adapted to blind men.

Broom Tops, the fresh and dried tops of *cytiscus scoparius* (common broom). There are two official preparations; the decoction (*decoctum scoparii*), consisting of a pint of distilled water to an ounce of the dried tops, and the juice (*succus scoparii*), made of three ounces of the fresh expressed juice to a pint of rectified spirits. They are valuable diuretics, especially in cardiac dropsies. Scoparine and sparteia are the two active principles; the action of sparteia is analogous to that of conia.

Brose (Gaelic *brothas*), a dish sometimes used in Scotland, made by pouring boiling water, milk, or the liquor in which meat has been boiled, on oatmeal, and mixing the ingredients by immediate stirring. Butter may be added, and sweet milk when the brose is made with water. It is kail brose, water brose, or beef brose, according to the liquid used. Athole brose, a famous Highland cordial, is a compound of honey and whisky.

Brother Jonathan, a name of personification applied to the people of the United States, as "John Bull" is to the people of England. The most widely accepted explanation of its origin rests on the tradition that Washington, on assuming command of the New England Revolutionary forces, being in great straits for arms and war material, and having a high regard for the judgment of his friend the governor of Connecticut, Jonathan Trumbull, said in that emergency, "We must consult Brother Jonathan." This expression, being repeated on other difficult occasions, came into common use, and at last was extended to the entire people of the country.

Brotherhood of Andrew and Philip, a religious order founded in 1888, and which has spread among the churches of 19 denominations and is represented in a large proportion of the States. Its official organ is 'The Brotherhood Star.' The pledge of service is similar to that of the Brotherhood of St. Andrew (q.v.). The name of the society contains an allusion to the fact that Andrew, the first of the 12 disciples to become a follower of Christ, immediately after entering upon his discipleship sought out his brother Philip and brought him to the Master.

Brotherhood of Saint Andrew, a religious organization of the Protestant Episcopal Church, founded in 1883 in St. James' Parish, Chicago. It has more than 1,200 active chapters, exclusive of the junior department. The society has extended to Canada, England, Scotland, Australia, the West Indies, and South America. The official organ of the brotherhood is 'St. Andrew's Cross,' published monthly. There are two rules, one of prayer and one of service. The pledge of service binds every member to make an earnest effort to bring at least one young man each week within the hearing of the gospel.

Brotherhood of Saint Paul, a fraternity of the Methodist Episcopal Church, founded in 1895, for the spiritual and social benefit of its members. Of the three orders into which it is divided — the Order of Jerusalem, the Order of Damascus, and the Order of Rome — the first is for new members and those who are not professing Christians; the second for members of the Methodist Episcopal Church, and the third for advanced Christians. The brotherhood has a ritual and a regalia.

Brotherton, Alice (WILLIAMS), American author and lecturer: b. Cambridge, Ind. She married William Ernst Brotherton, 18 Oct. 1876. She has lectured on Shakespeare and other subjects in English literature, contributed to magazines, and published the volumes: 'Beyond the Veil' (1886); 'The Sailing of King Olaf' (1887); and 'What the Wind Told the Tree-tops' (1888).

Brough, John, American statesman: b. Marietta, Ohio, 17 Sept. 1811; d. Cleveland, 29

BROUGHAM

Aug. 1865. In his youth he was a printer's apprentice. He studied at the Ohio University and later entered journalism. As a Democratic orator he became well-known. In 1846 he entered the legal profession. In 1864 the Republican Union party nominated him for governor and he was elected by a joint vote of all electors advocating war. He has been called the "war governor" of his State.

Brougham, Henry (BARON BROUGHAM AND VAUX), British statesman and jurist: b. Edinburgh, 19 Sept. 1778; d. Cannes, 7 May 1868. His father, Henry Brougham, belonged to an old Westmoreland family, and his mother, Eleonora Syme, was a niece of Robertson the historian. He was educated at the High School and the University of Edinburgh, entering the latter at the age of 16. At the age of 18 he wrote an essay, 'Observations on the Phenomena of Light,' which, being sent to the Royal Society, was printed in its 'Transactions' for 1796. He also contributed a paper to each of the next two volumes of the Royal Society's 'Transactions.' On leaving college he devoted himself to the study of law at Edinburgh, and was admitted a member of the Society of Advocates in 1800. As a member of the Speculative Club he was brought into contact with Jeffrey, Horner, and others afterward famous; and along with the above-mentioned writers and Sydney Smith bore a chief part in the starting of the 'Edinburgh Review' in 1802, to which he contributed a great number of articles. In 1803 appeared his 'Inquiry into the Colonial Policy of the European Powers,' a work which showed a wide extent of knowledge in the author, and drew upon him considerable attention. In it he expressed his decided hostility to the slave-trade. Finding too circumscribed a field for his abilities in Edinburgh, he removed to London, and in 1808 was called to the English bar. One of the first occasions on which he distinguished himself in his professional capacity was in 1810, when he spoke before the House of Lords in behalf of some Liverpool merchants who wished the repeal of the orders in council prohibiting trade with the states subject to France. The same year he entered Parliament as member for the rotten borough of Camelford, joined the Whig party, which was in opposition, and soon after obtained the passing of a measure making the slave-trade felony. He also succeeded, before the dissolution of Parliament, in getting the orders in council repealed. At the general election in 1812 he endeavored to get himself elected as one of the members for Liverpool, but was defeated by Canning, and remained without a seat till 1816, when he was returned for Winchelsea. He represented this borough up to 1830. On his return to Parliament he began his life-long efforts in the cause of education by obtaining the appointment of a committee to inquire into the state of education among the poor of the metropolis. In 1819 he and his friends established a model school for the children of the poorer classes in London. In 1823 he was instrumental in founding the first mechanics' institute. In 1825 he published his 'Practical Observations upon the Education of the People,' which ran through 20 editions. The same year he was elected lord rector of *Glasgow University*; and also introduced a bill into Parliament for the incorporation of the

London University, of which he may be considered one of the chief founders. He also bore an active part in establishing the Society for the Diffusion of Useful Knowledge in 1827, the first publication of which was his 'Discourse on the Objects, Pleasures, and Advantages of Science.' Meantime his reputation as a brilliant speaker and able advocate had been gradually increasing, and his fearless and successful defense of Queen Caroline in 1820-1 placed him on the pinnacle of popular favor. Two of the speeches spoken by him in this course are looked upon as classic specimens of English eloquence. But the part he took in the defense of the queen brought him into disfavor with the king, and delayed his promotion for some years, so that it was not till 1827 that he was made a king's counsel. In Parliament he continued to speak against negro slavery, and in favor of what may be considered the most valuable of the reforms that we owe to him; namely, the amendment of the common law and of the judicial administration. On this subject he delivered a famous speech of six hours' duration, on 7 Feb. 1828. At the general election of 1830 he was returned for the large and important county of York, an honor which he attributed chiefly to a celebrated speech delivered by him shortly before on the slave-trade. In the ministry of Earl Grey he accepted the post of lord chancellor, and 22 Nov. 1830, was raised to the peerage, with the title of Baron Brougham and Vaux. The Reform Bill of 1832 received his warmest support in the House of Lords. In 1834, when the Whig ministry were dismissed, Lord Brougham of course lost the chancellorship, and this proved the end of his official life, as he was never afterward a member of any ministry. Henceforth he devoted himself chiefly to legal and social reforms, maintaining his hostile attitude toward slavery, and continuing his labors in the cause of popular education. He was a zealous opponent of the corn laws. In connection with the acts of his later years, we may mention his presidency of the Law Amendment Society, and of the Social Science Association. He latterly resided much at Cannes, in the south of France. He married, in 1819, Mary Anne Eden, and had two daughters, one of whom died in infancy in 1820, the other in 1839, at the age of 17. Lord Brougham accomplished a large amount of literary work, contributing to newspapers, reviews, and encyclopedias, besides writing several independent works; and he had no mean reputation in mathematics and physical science. His works, collected by himself, and published in 10 volumes (Edin. 1855-7), include: 'Lives of Men of Science, Time of George III.'; 'Lives of Men of Letters, Time of George III.'; 'Eminent Statesmen'; 'Natural Theology'; 'Rhetorical and Literary Dissertations and Addresses,' 'Rhetorical and Political Dissertations'; and 'Speeches on Social and Political Subjects.' He also, along with Sir Charles Bell, brought out an edition of Paley's 'Natural Theology'; translated the oration of Demosthenes 'On the Crown'; and in 1855, conjointly with Mr. E. J. Routh, published an 'Analytical View of Sir Isaac Newton's Principia.' He was president of University College, London, chancellor of Edinburgh University, D.C.L. of Oxford, and a member of the Institute of France. Lord Brougham must be looked upon as one of the most remarkable

men of his century. His energy and industry were enormous, his versatility surprising. He was a mathematician, a historian, a biographer, an essayist, a moral and political philosopher, a lawyer, an orator, and a statesman. As an orator and parliamentary debater he was inferior to Canning alone.

Brougham, John, Irish actor and playwright: b. Dublin, 9 May 1810; d. New York, 7 June 1880. He was at first a student of surgery, but when thrown on his own resources he adopted the stage as a profession. After a short experience as actor, playwright, and manager, he came to America in 1842. Eighteen years later he returned to England, but in 1865 he again came to the United States, and remained here till his death. He wrote about 100 plays, including 'The Game of Love'; 'Romance and Reality'; 'Love's Livery'; 'The Duke's Motto,' etc., and contributed largely to periodicals.

Brougham, a close four-wheeled carriage with a single inside seat for two persons, or a four-wheeled close carriage with two seats, accommodating four persons. Each type is glazed in front and has a raised seat for the driver. Named after Lord Brougham.

Broughton, Hugh, English Biblical scholar: b. Owlbury, Shropshire, 1549; d. London, 4 Aug. 1612. He was educated at Cambridge, and early became distinguished for his familiarity with the learned tongues. He entered the Church, but his views coming under ecclesiastical disapproval, he went to the Continent for a time. For several years he preached to an English congregation in one of the cities of Holland. He wrote: 'A Concert of Scripture'; and an 'Explication of the Article of Christ's Descent into Hell.' Ben Jonson in two of his plays holds up to ridicule this Puritan preacher.

Broughton, brow'ton, Lord (JOHN CAM HOBHOUSE), Baron, English statesman and writer: b. Bristol, 27 June 1786; d. London, 3 June 1869. He was educated at Westminster School and Trinity College, Cambridge, where he graduated B.A. in 1808, and M.A. in 1811. He was an intimate friend of Lord Byron, and accompanied him in his travels to Greece and Turkey in 1809. In 1812 appeared his 'Journey Through Albania and Other Provinces of Turkey.' In the years 1813 and 1814 he accompanied the allied armies in Germany, and was present at the battle of Dresden. He also accompanied Byron to Italy in 1816-17, and visited Rome and Venice with him. He suggested an extension of the fourth canto of 'Childe Harold,' which Byron dedicated to him, and by arrangement with the poet he undertook to write for it a series of notes, for which his observations during their journey furnished materials. These notes were written at Venice, and ultimately formed a separate work, 'Historical Illustrations of the Fourth Canto of Childe Harold,' published by Murray in 1818. Hobhouse was an advanced liberal in politics, and on his return took an active part in the advocacy of reforms. In 1816 he published anonymously the 'Hundred Days in Paris,' which from its hostility to the Bourbon cause, gave great offense to the governments of France and England, and a French translator and the publisher of it were fined

and imprisoned for writing an anonymous pamphlet, the 'Trifling Mistake.' Broughton was committed to Newgate, and there lay for almost three months. That year he was returned for Westminster, and became a supporter of liberal measures, as the Reform Bill of 1832, the repeal of the Test and Corporation acts, the removal of Catholic disabilities, etc. In February 1832, he entered Lord Melbourne's ministry as secretary of war, and became a privy councillor. In 1833 he was made chief secretary for Ireland, but lost his seat in seeking re-election. In 1834, he was made chief commissioner for woods and forests, and the following year became president of the board of control. He lost his seat for Nottingham in 1847, but a seat was found for him at Harwich, which he continued to occupy till he was raised to the peerage in 1851. He had succeeded his father as baronet in 1831. As he left no male issue, the title became extinct, the baronetcy passing to his nephew.

Broughton, Rhoda, English novelist: b. North Wales, 29 Nov. 1840. Much of her life has been passed at Oxford. Her novels, especially the earlier ones, show great cleverness, and are very popular. They include 'Cometh Up as a Flower' (1867); 'Not Wisely but Too Well' (1867); 'Red as a Rose Is She' (1870); 'Goodbye, Sweetheart, Goodbye' (1872); 'Nancy' (1873); 'Belinda' (1883); 'Doctor Cupid' (1886); 'Alas!' (1890); 'A Beginner' (1894); 'Scylla or Charybdis?' (1895).

Brouncker, or Brounker, William, British mathematician: b. 1620; d. 1684. He became Viscount Brouncker of Castle-Lyons, in Ireland, inheriting the title from his father. He was strongly attached to the royal cause, and in 1660 was one of the first to sign the declaration which hailed Monk as the restorer of the laws and privileges of the nation. At the Restoration he was appointed to several lucrative offices, and on the formation and incorporation of the Royal Society became its first president. This honorable office he continued to hold for 15 years. His mathematical attainments must have been of a high order, as he is admitted to have been the discoverer of continued fractions, and of an important theorem relating to the quadrature of the equilateral hyperbola. He also published experiments on the recoiling of guns, and a translation of Descartes' 'Musicae Compendium,' with notes.

Broussa, brö'sa. See BRUSSA.

Broussais, François Joseph Victor, French physician: b. Saint Malo, 17 Dec. 1772; d. 17 Nov. 1838. Educated at the college of Dinan, he entered the army and soon attained the rank of sergeant; but a severe illness caused him to give up a military career and devote himself to medicine. He studied at Brest and Paris, and in 1820 obtained a professorship at Val-de-Grâce, a chair which he exchanged in 1831 for that of general pathology in the faculty of medicine at Paris. His first important work was his 'Recherches sur la Fièvre Hectique' (1803), which was followed by the more celebrated 'Histoire des Phlegmasies ou Inflammations Chroniques' (1808), and 'Examen de la Doctrine Médicale Généralement Adoptée' (1816). In these works he propounded what is known as the physiological system of medicine. According to him irritation or excitation is the funda-

mental property of all living animal tissues, and diseases are produced by an undue increase or diminution of that property. Broussais also taught and wrote on phrenology.

Brousson, Claude, French martyr: b. Nismes, 1647; d. Montpellier, 4 Nov. 1698. He was educated for the law, and practised as an advocate first at Castres and Castelnaudary, and afterward in the Parliament of Toulouse, where the Protestants, to whom he belonged, were often indebted to him for the zeal and ability with which he defended their cause. In 1683, when the government had resolved on recalling the edict of Nantes, and trying the effect of persecution as a means of suppressing the Reformation, it was at Brousson's house the deputies from all the churches assembled, and resolved that, even were their churches destroyed they would still hold their meetings, though it should be under the canopy of heaven. His part in this and other important movements marked him out as one of the first objects of attack; and on receiving warning of an intention to arrest him, he sought an asylum at Lausanne, where he published several works, exposing the persecutions to which the Protestants of France were subjected, and awakening the sympathy of their brethren in all other parts of Europe. Nor was he satisfied merely to aid the cause with his pen. At the hazard of his life he returned to France, and continued for four years among the recesses of the Cevennes, preaching the gospel. In 1693 he repaired to Holland, where a pension was given him by the States-General; but the sufferings of his persecuted countrymen were ever uppermost in his mind, and he visited many courts of Europe to plead their cause, and more than once went to France for their instruction and encouragement. He was on a mission to France when, a price having been set on his head, he was arrested at Oleron, tried at Montpellier, condemned to be broken on the wheel, and executed accordingly.

Broussonet, Pierre Marie Auguste, French naturalist: b. Montpellier, 28 Feb. 1761; d. there, 27 July 1807. In Paris he studied natural history; went to England and pursued ichthyology, and after three years' residence there returned and was assistant in the College of France. At this period he communicated a number of valuable papers to the Academy of Sciences, of which he became a member. In 1785 he was appointed secretary to the Paris Agricultural Society. Merino sheep and the Angora goat are said to have been first introduced by him into France. The Revolution breaking out, he became connected with the Girondists. On the downfall of that party he was arrested at Montpellier, but having escaped, crossed the Pyrennes under the pretext of botanizing, and arrived in Spain destitute. Later he went to Africa and resumed his botanical studies, making some important collections. Returning to France, after executing various missions he was appointed, in 1805, to the chair of botany at Montpellier. In the same year he became a member of the Corps Législatif. He died from the effects of a fall by which the brain had been seriously injured. Besides his *Ichthyologia Decas Prima* (1872), his publications include important memoirs of ichthyology and botany.

Broussonetia, a genus of trees. See MULBERRY.

Brouwer, or Brauwer, Adrian. See BRAUWER, ADRIAN.

Brower, Daniel Roberts, American physician: b. Philadelphia, Pa., 1839. In 1864 he was appointed assistant surgeon of the United States volunteers and has since been medical superintendent of the Eastern Lunatic Hospital of Virginia, 1868-75, and professor of nervous diseases in the Rush Medical College of Chicago, and in the Woman's Medical College of the Northwest University at Evanston, Ill. He has published a *Manual of Insanity*.

Brower, Jacob Vradenburg, American explorer and archæologist: b. York, Mich., 21 Jan. 1844. He served in the cavalry and the navy during the Civil War, was a member of the Minnesota legislature, 1867-73, and has discovered numerous prehistoric mounds at Mille Lac and other points in Minnesota. He has published *'The Mississippi River and Its Source'* (1893); *'Prehistoric Man at the Head Waters of the Mississippi'* (1895); *'The Missouri River and Its Utmost Source'* (1896); *'Quivira'* (1898); *'Harahey'* (1899); *'Mille Lac'* (1899).

Brown, Aaron Venable, American politician. b. Brunswick County, Va., 15 Aug. 1795; d. 1859. He studied law, and commenced practice in Nashville, Tenn. He was partner in business with President Polk, until the latter entered upon his congressional career; served in almost all the sessions of the legislature of Tennessee between 1821 and 1832; was a member of the House of Representatives in Congress from 1839 to 1845; and was in that year elected governor of Tennessee. He was a delegate to the southern convention held at Nashville in 1850, and submitted a report to that body known as the Tennessee platform. He was also a member of the convention of the democratic party at Baltimore in 1852, to which he reported the platform adopted by them. In 1857 he became a member of President Buchanan's cabinet, in which he held the office of postmaster-general.

Brown, Abbie Farwell, American writer for young people. b. Boston, about 1875. She has published *'The Book of Saints and Friendly Beasts'* (1900); *'In Days of Giants'* (1902); *'The Lonesomest Doll'*.

Brown, Abram English, American historical writer: b. Bedford, Mass., 21 Jan. 1849, and has ever since resided there. He is the author of *'Beneath Old Roof Trees'* (1896); *'Beside Old Hearstons'* (1897); *'History of Bedford'* (1892); *'Glimpses of New England'* (1894); *'Flag of the Minute Men'* (1894); *'Faneuil Hall and Market'*; *'John Hancock'*.

Brown, Alexander, American historian: b. Glenmore, Nelson County, Va., 5 Sept. 1843. He served in the Confederate army during the Civil War and since 1880 has devoted himself to literary pursuits. He is the author of *'New Views of Early Virginia History'* (1886); *'The Genesis of the United States'* (1890); *'The Cabells and Their Kin'* (1895); *'The First Republic in America'* (1898); *'The History of Our Earliest History'* (1898); *'English Politics in Early Virginia'* (1901).

Brown, Alice, American novelist and writer of short stories descriptive of phases of New England life: b. Hampton Falls, N. H., 5

Dec. 1857. She taught school for several years, but has given herself entirely to literary pursuits for some years. Her work is most careful and conscientious in character, displaying equal literary skill and sympathetic insight into character. She has published: 'Fools of Nature'; 'Meadow Grass' (1895); 'By Oak and Thorn,' a volume of English travels (1896); 'The Road to Castaly,' a work of verse (1896); 'The Day of His Youth' (1896); 'Tiverton Tales' (1899); 'King's End'; 'Margaret Warrener'; 'Mercy Otis Warren,' a biography.

Brown, Benjamin Gratz, American politician: b. Lexington, Ky., 28 May 1826; d. St. Louis, 13 Dec. 1885. He practised law in Missouri, and was a member of the State legislature in 1852-8. In the Civil War he served in the Union army, recruiting a regiment, and becoming a brigadier-general of volunteers. In 1863-7 he was United States Senator from Missouri, and in 1871 was elected governor of his State. He was the candidate for the vice-presidency of the United States on the ticket with Horace Greeley in 1872.

Brown, Caroline Virginia (KROUT), American novelist: b. Crawfordsville, Ind. She is a sister of Mary H. KROUT (q.v.), and has always lived in her native town. She has published 'Knights in Fustian' (1900).

Brown, Charles Brockden, American novelist: b. Philadelphia, 17 Jan. 1771; d. 22 Feb. 1810. He descended from a family of Quakers, was remarkable in his childhood for his attachment to books, and at the age of 16, after having received a liberal education, had already formed plans of extensive literary works. The delicacy of his constitution incapacitated him for the bustle of business and all athletic amusements. During frequent visits to New York he became intimate with a literary club, who fostered his devotion to letters, and increased his eagerness to be conspicuous as a writer. He kept minute journals, indited essays and dissertations, and cultivated, with unremitting assiduity, the arts of composition. The first novel which he wrote was entitled 'Sky Walk,' subsequently incorporated in 'Edgar Huntley.' 'Wieland,' his first published novel, appeared in 1798. It soon acquired the reputation of a powerful and original romance. The next was 'Ormond, or the Secret Witness' (1799), which had neither the success nor the merit of the other, but still exhibits uncommon powers of invention and description. At this time Brown had begun no less than five novels, two of which — 'Arthur Mervyn' and 'Edgar Huntley,' — were completed and sent forth almost immediately. In the former the ravages of the yellow fever, which the author had witnessed in New York and Philadelphia, are painted with terrific realism. All these works abound in both excellencies and faults, and are strikingly original. In 1801 he published another novel, — 'Clara Howard,' — less open to exception, but also less deserving of praise. Its form is different from that of the others, being epistolary. The last of his novels was 'Jane Talbot' (1804). It is deficient in interest, and indeed in all respects inferior to its predecessors. In April 1799, Brown published the first number of the 'Monthly Magazine and American Review.' This work he continued until the end of the

year 1800, writing abundantly for it. Circumstances compelled him to relinquish it; but in 1805 he commenced another journal, with the title of the 'Literary Magazine and American Register,' and in this undertaking persevered for five years. In 1806 he entered upon a new work, a semi-annual 'American Register,' five volumes of which he lived to complete and publish. It is now and must long be consulted as a valuable body of annals. In 1809 it was discovered that his lungs were seriously affected, and he then consented to travel for the recovery of his health. The remedy, however, was applied too late. In November of that year he betook himself to his chamber, as he thought, for a few days; but his confinement lasted until February, and ended only with his life. His writings are characterized by rich diction, variety of incident, and vivid representation, but he deals too much in the extravagant and the horrible.

Brown, Charles Rufus, American clergyman and Hebrew scholar: b. East Kingston, N. H., 22 Feb. 1849. He was graduated at the United States Naval Academy in 1869, at Harvard in 1877, and at Union Theological Seminary in 1879. He was ordained a Baptist minister in 1881 and held pastorates at Salem and Worcester, Mass. He has been professor of Hebrew at Newton Theological Institution since 1886, and has written important text-books in the Oriental languages.

Brown, Elmer Ellsworth, American educator: b. Kiantone, N. Y., 28 Aug. 1801. After holding several professional posts he became professor in the University of California in 1893 and has been professor of the theory and practice of education there from 1898. He is the author of 'Democracy in the Universities' (1891); 'The Making of Our Middle Schools' (1903).

Brown, Emma Elizabeth, American author and artist: b. Concord, N. H., 18 Oct. 1847. She was educated in the Concord common schools. She has written lives of Washington, Grant, Garfield, Holmes, and Lowell; 'From Night to Light,' 'Child Toilers,' and much verse, besides contributing illustrated papers to leading magazines.

Brown, Ernest William, American mathematician: b. Hull, England, 29 Nov. 1866. He was educated at Christ's College, Cambridge, England, and has been a professor of mathematics at Haverford College, Pa., since 1891. He is a Fellow of the Royal Society of England, and the author of a noteworthy 'Treatise on the Lunar Theory.'

Brown, Ford Madox, English painter, grandson of Dr. John Brown of Edinburgh, the author of the Brunonian system of medicine: b. Calais, France, 16 April 1821; d. London, 6 Oct. 1893. He studied at Bruges, Ghent, and Antwerp, and after a three years' residence in Paris he went to England about 1845. In 1844 and 1845 he contributed (unsuccessfully) cartoons of the 'Finding of the Body of Harold,' 'Justice,' and other subjects to the competitive exhibition for the frescoes of the Houses of Parliament. In 1865 he opened in London an exhibition of many of his pictures, including 'The Last of England' (1852); 'The Autumn Afternoon'; and 'Work' (1865); the last named having occupied him for several years. Only

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a month before his death he completed the last of the 12 Manchester town-hall frescoes, on which he had been engaged for a long time. Among his other works are 'Lear and Cordelia' (1849); 'Pretty Baa-Lambs' (1851); 'Chaucer at the Court of Edward III.' (1851); and 'Cordelia's Portion.' He is generally rated as a pre-Raphaelite, but though a close intimacy existed between him and the brotherhood, he never actually joined them. See Hueffer, 'Ford Madox Brown: a Record of His Life and Work' (1896).

Brown, Francis, American scholar: b. Hanover, N. H., 26 Dec. 1849. He was graduated from Dartmouth College in 1870, and the Union Theological Seminary, New York, in 1877. He was instructor in biblical philology in the latter institution 1879-81, and associate professor of the same 1881-90. Since the year last named he has been professor of Hebrew there. He is the author of 'Assyriology: Its Use and Abuse in Old Testament Study' (1885); 'The Teaching of the Twelve Apostles' with Hitchcock; 'Hebrew and an English Lexicon of the Old Testament' with Driver and Briggs (1891-1901).

Brown, Sir George, English military officer: b. near Elgin, Scotland, 1790; d. 1865. He served in the Peninsular war, and in the American campaign of 1814, being wounded at the battle of Bladensburg. He became lieutenant-general in 1851; and distinguished himself in the Crimean war at Alma, Inkermann, and Sebastopol. He was made K. C. B. in 1855.

Brown, George, Canadian statesman: b. Edinburgh, Scotland, 19 Nov. 1818; d. 9 May 1880; educated at the high school there. He emigrated to the United States with his father, and assisted in the management of a newspaper at New York; but in 1843 removed to Toronto, Canada, where he founded a newspaper, *The Globe*, which was very successful. In 1852 he was returned to Parliament, and rapidly rose to the first rank as a debater and advocate of reforms. In 1858 he was called to the office of premier, and formed an administration which, however, owing to an adverse vote of the Assembly, lasted only three days. In 1864 he joined the coalition government as leader of the reform section, and took an active part in the conferences held at Charlottetown and Quebec on the subject of the federation of the North American colonies; but resigned his office as minister in December 1865. He was called to the Senate in 1873, and the year after went to Washington along with Sir Edward Thornton to negotiate a commercial treaty with the United States. He died of a gunshot wound inflicted by a discharged employee. See Mackenzie, 'Life and Speeches of the Hon. George Brown' (1882).

Brown, George, American rear-admiral: b. Indiana, 19 June 1835. He entered the navy in 1849 and served with distinction in the Federal navy during the Civil War. He was in command of the Norfolk navy yard, 1866-97, being appointed a rear-admiral in 1893.

Brown, George Douglas, Scottish novelist: b. Ochiltree, Ayrshire, Scotland, 1869; d. London, 28 Aug. 1902. He was educated at the universities of Glasgow and Oxford and was successively reporter for a London journal and

literary adviser to a publishing house. His novel of Scottish life, 'The House with the Green Shutters,' published in 1902, attracted great attention in England and the United States. See 'Life' (1903).

Brown, George Loring, American landscape artist: b. Boston, 2 Feb. 1814; d. 25 June 1889. He went abroad at 16 and on his return, two years later, was a pupil of Washington Allston. In 1840 he went to Paris to study under Isabey. Among noted pictures by him are 'Doge's Palace and Grand Canal'; 'Bay of Naples'; 'Moonlight Scene'; 'The Crown of New England'; and 'The Bay of New York,' the two latter acquired by Edward VII. when visiting the United States as Prince of Wales.

Brown, George William, American jurist: b. Baltimore, Md., 1812; d. 1890. After studying law he was admitted to the bar and in 1860 was elected mayor of his native city. At the time of the passage of troops through Baltimore, 19 April 1861, he placed himself at the head of the 6th Massachusetts regiment then on its way to Washington, and did everything in his power to suppress the riot which the appearance of the soldiers had occasioned. He was chief justice of the Maryland supreme court, 1873-88, and with two others compiled the first 'Digest of the Decisions of the Maryland Court of Appeals' (1847).

Brown, Glenn, American architect: b. Fauquier County, Va., 13 Sept. 1854. He has practised his profession in Washington, D. C., since 1878. He is the author of 'Water Closets: a Historical, Mechanical and Sanitary Treatise' (1884); 'Healthy Foundations for Houses' (1885); 'Trap Syphonage' (1886); 'History of the United States Capitol' (1900).

Brown, Goold, American grammarian: b. Providence, R. I., 7 March 1791; d. Lynn, Mass., 31 March 1857. He is known as the author of 'Brown's Grammar,' a school text-book widely used for some generations, and still in circulation. He published 'First Lines of English Grammar' (1823); 'Grammar of English Grammars' (1850-1); etc. He taught an academy in New York for 20 years.

Brown, Harvey, American army officer: b. Rahway, N. J., 1795; d. Clifton, Staten Island, 31 March 1874. He graduated at West Point in 1818 and was in constant service for more than 45 years. In the Black Hawk expedition, the Seminole Indian campaigns, in the Army of Occupation in Mexico, and to the time of the Civil War, he did gallant duty, for which he received several brevets. In 1862 he was brevetted a brigadier-general in the regular army and promoted colonel, and in 1863 was promoted to major-general, and retired.

Brown, Helen Dawes, American novelist and lecturer upon English literature: b. Concord, Mass., 1857. She has published 'Two College Girls' (1886); 'The Petrie Estate' (1893); 'Little Miss Phoebe Gay' (1895); 'Phoebe Gay in Her Sixteenth Year'; 'A Civilian Attache.'

Brown, Henry Billings, American jurist: b. Lee, Mass., 2 March 1836. After studying law in the Yale and Harvard law schools he went to Detroit and was there admitted to the bar in 1860. In 1875 he was appointed United States district judge for eastern Michigan,

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retaining this post till 1890, when he became an associate justice of the supreme court of the United States. He has compiled a much valued volume of admiralty reports.

Brown, Henry Kirke, American sculptor: b. Leyden, Mass., 24 Feb. 1814; d. Newburg, N. Y., 10 July 1886. He made the equestrian statue of Washington in Union Square, New York, the altar piece for the Church of the Annunciation in the same city, portrait busts of William Cullen Bryant, Dr. Willard Parker, Erastus Corning and other New York men, and the statue of De Witt Clinton in Greenwood cemetery. The last named was the first bronze statue cast in the United States. Mr. Brown brought skilled workmen from Europe and did the first work in bronze casting attempted in this country. Some of his other well-known works are a statue of Lincoln in Prospect Park, Brooklyn, and equestrian statues of Gen. Scott and Nathanael Greene for the national government.

Brown, J. Appleton, American artist: b. Newburyport, Mass., 24 July 1844. He studied art in Boston and Paris, and after having a studio in Boston for some years removed to New York in 1890 and became a member of the Society of American Artists. Noted works by him are 'Old Road Near Paris'; 'On the Merrimac at Newburyport'; 'The Grain Field' (1902).

Brown, Jacob, American general: b. Bucks County, Pa., 9 May 1775; d. Washington, 24 Feb. 1828. He was descended from members of the Society of Friends; supported himself in early life by teaching school; was also employed for some time as a surveyor of public lands in Ohio; and settling in Jefferson County, N. Y., in 1799, became one of the pioneers in that part of the country. He next joined the militia service as a militia general in 1812; was soon after appointed brigadier-general in the regular army, and in 1814, major-general; assisted in the defense of Sackett's Harbor in 1813; exhibited much bravery in the battle of Chippewa, in that of Niagara Falls, and at the siege of Fort Erie; received the thanks of Congress and a gold medal, "emblematical of his triumphs"; and finally, at the termination of the war, continued in the army as major-general, and in 1821 succeeded to the supreme command.

Brown, James, American book-publisher: b. Acton, Mass., 19 May 1800; d. 10 March 1855. He began life as a servant in the family of Prof. Hedge, of Cambridge, who gave him instructions in the classics and in mathematics. He next entered, as shop boy, the service of William Hilliard, and in due time was taken into the Boston publishing firm of Hilliard, Gray & Company. Upon its dissolution, by the death of some of the partners, he became one of the firm now known as Little, Brown & Company, and remained in this connection until his death. The special province of the firm was the publication of law books and importation of foreign editions in the general trade, in which departments his scholarly accomplishments and taste were conspicuous and of good service in improving the style of book-making in America.

Brown, John, Scotch covenanting martyr: b. about 1627. He is said to have fought against the government at Bothwell Bridge in 1679, and to have been on intimate terms with the leaders

of the persecuted party. He was shot by Claverhouse and a party of his dragoons at Priestfield, or Priesthill, in the upland parish of Buirkirk, Ayrshire, where he cultivated a small piece of ground and acted as a carrier, in 1685.

Brown, John, Scottish biblical scholar: b. Carpow, Perthshire, 1722; d. 19 June 1787. By his own intense application to study he became acquainted with the French, Italian, German, Arabic, Persian, Syriac, and Ethiopic languages, as well as the Greek and Hebrew. He became pastor at Haddington, Scotland, in 1751, and remained in that relation till his death, though called to a pastorate in the Dutch Reformed Church in New York in 1784. In general he preached three sermons every Sabbath day. He was appointed professor of theology to the Associate Synod in 1768. His most important works are: 'The Self-interpreting Bible'; 'Dictionary of the Bible'; 'Explication of the Assembly's Catechism'; 'The Christian Journal'; 'Explication of Scripture Metaphors'; 'System of Divinity'; 'General History of the Church'; 'Particular History of the Churches of England, Scotland, and Ireland'; and 'Harmony of Scripture Prophecies.' His 'Dictionary of the Bible,' and 'Self-Interpreting Bible,' so called from the copious marginal references to other passages of Scripture by which it is distinguished, have gone through many editions.

Brown, John, Scottish physician, author of the Brunonian system in medicine: b. Buncle, Berwickshire, 1735; d. London, 17 Oct. 1788. His parents were in a very humble sphere in life, his father being merely a day laborer. Like the children of other Scottish cottars, however, he received the advantage of being educated at the parish school, where he was very soon distinguished for his abilities, and the rapid progress he made in his studies. His father having died, his mother married a weaver, and young Brown was bound an apprentice to that business; but the distaste he evinced for it was so great as to induce his stepfather to cancel his indentures, and remove him to the grammar school of Dunse, where he was looked upon as a prodigy—reading all the Latin authors with the greatest facility, and soon making considerable progress in Greek. In 1755 he went to Edinburgh, with the intention of studying divinity and entering the Church, but soon abandoned his theological studies. Having been employed by a medical student to translate his thesis into Latin, he succeeded so well that the elegance and purity of the language attracted the notice and encomiums of the professors and led to his commencing the study of medicine. In the year 1765 he married, and opened a boarding house for the accommodation of medical students; but being irregular and intemperate in his habits was soon reduced to bankruptcy. Having taken the degree of doctor in medicine at St. Andrew's, he commenced practice in Edinburgh, and produced his celebrated work, entitled the 'Elements of Medicine.' He then commenced lecturing on the practice of physic, and made use of this work as his text-book. He divided all diseases into two classes, those resulting from a deficiency, and those resulting from an excess of excitement; the one class to be treated with stimulants, the other with debilitating medicines. Becoming involved in pecuniary embarrassments he removed to London in 1786. The sys-

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tem of physic which he taught, though no longer accepted as a system, had a distinct influence on subsequent practice.

Brown, John, American merchant: b. Providence, R. I., 27 Jan. 1736; d. there, 20 Sept. 1803. A man of energy and enterprise, he developed the industry and extended the trade of his native city in a notable degree, being, it is said, the first merchant in Rhode Island to carry trade to China and the East Indies. Though having large interests at stake in the existing order of things, he was a leader in the cause of the American Revolution, and headed the party which destroyed the Gaspée in Narragansett Bay, 17 June 1772. He was chosen a delegate to the Continental Congress in 1784, but did not take his seat in that body. When Rhode Island refused to adopt the national Constitution, he did more than any other man toward securing the final reversal of that opposition. From 1799 to 1802 he was a representative in Congress. He at all times fostered the interests of the Baptist Church, contributed largely to the endowment of the present Brown University, laid the cornerstone of its original hall, and was its treasurer from 1775 to 1796.

Brown, John, American soldier: b. Sandisfield, Mass., 19 Oct. 1744; d. Stone Arabia, N. Y., 19 Oct. 1780. He graduated at Yale 1771, studied law in Providence, R. I., and in 1773 settled in Pittsfield, Mass., where he identified himself actively with the patriot cause. In 1775 he was a delegate to the provincial Congress, and was with Ethan Allen at the capture of Ticonderoga. In the same year he assisted in the capture of Fort Chambly, planned the attack on Montreal which resulted disastrously, and was at the storming of Quebec. Congress commissioned him a lieutenant-colonel in 1776, and in 1777 he conducted an expedition against Ticonderoga and the posts in its vicinity, releasing one hundred American prisoners and capturing large quantities of stores and provisions. Soon after this he retired from the service on account of his detestation of Arnold. At Albany in the winter of 1776-7 he published a handbill denouncing Arnold, predicting that he would become a traitor, and closing with the remarkably prophetic words, "Money is this man's God, and to get enough of it he would sacrifice his country." Brown was afterward employed in the Massachusetts service, and in the autumn of 1780, with the Berkshire militia, marched up the Mohawk valley for the relief of Schuyler and to act as circumstances might require. He was killed in ambush with 45 of his men at Stone Arabia, in Palatine, on his birthday.

Brown, John, Scottish clergyman: b. Whitburn, Linlithgowshire, 12 July 1784; d. Edinburgh, 13 Oct. 1858. He was ordained pastor of the burgher congregation at Biggar in 1806. In 1821 he removed to the care of the United Secession Church, Edinburgh, and afterward that of the Broughton-place Church. The burgher and anti-burgher seceders having come together in 1820, under the name of the united associate synod, he was chosen one of their professors of divinity in 1835. He took the part of the parent society on the division in the British and Foreign Bible Society, concerning the circulation of the Apocrypha, and the voluntary side on the question of church establishments. Having, by residence within the royalty of the

city of Edinburgh, become liable to the payment of an annuity tax, which was levied upon him, for the support of the city ministers, he refused to pay, and suffered his goods to be distrained; and in reply to the proceedings of the civil authorities, he preached and published two sermons on the "Law of Christ Respecting Civil Obedience, Especially in the Payment of Tribute," which, with notes and additions, became finally an octavo volume. In 1847 he and his congregation entered the United Presbyterian Church. Other works of his are: 'The Resurrection of Life' (1852); 'Expository Discourses on the Epistle of Saint Peter' (1848); 'Discourses and Sayings of Christ' (1850).

Brown, John, American abolitionist leader: b. Torrington, Conn., 9 May 1800; d. 2 Dec. 1859. His paternal ancestry was of Mayflower stock, his grandmother of Welsh, his mother of Dutch. His grandfather was a captain in the Revolution. His father, who drew his abhorrence of slavery from Jonathan Edwards, an anti-slavery champion, shared in the forcible rescue of fugitive slaves in 1798. The son found his warrant against slavery in the Bible, where its defenders found their warrant for it. From the age of five he grew up in Ohio. He was an exceedingly active and adventurous boy, who loved play-fights, but not real ones, disapproved of war, and in manhood paid annual fines rather than perform militia duty. His detestation of slavery was confirmed by witnessing the abuse of a slave boy; he swore in his own words, "eternal war against slavery"; and throughout his career he never lost sight of this life-work. His 12 children who grew to maturity (out of 20 he had by two wives) were ingrained with his spirit, pledged themselves to him in prayer to spend their lives making it operative, and bore great privations to furnish him the means of so doing. He became a farmer and leather-dresser, surveyor, shepherd, and wool dealer; unfixed, unprosperous, and esteemed "shiftless." This was certainly not due to indolence or lack of honor; his immense family and want of money-getting faculty were partly responsible, his absorption in a fixed idea and lack of interest in money-getting still more. By 1834, then in Pennsylvania, he had devised an association of abolitionist families to educate colored youth, believing that it would force the South into speedy emancipation. Seeking co-operation in this plan, he removed to Ohio in 1835, and to Massachusetts in 1846; in 1840 he made surveys of Oberlin College lands in Virginia, and projected a negro colony there. In 1846 Gerrit Smith (q.v.) offered 100,000 acres of northern New York lands in small farms to colored families who would clear them; and in 1848, to work among them, Brown bought a farm in North Elba, where his family lived till his death, working with and for him. History can hardly parallel so large a family's unanimity of self-sacrifice for a social ideal, in whose behalf they stinted themselves ungrudgingly: a testimony to the father's commanding nobility of soul. From thence, by grace of contributions from abolitionists who had come to know and respect him, he traveled often on errands of organizing resistance to slavery. In 1850, after the passage of the Fugitive slave law, he visited Springfield, Mass., his former residence, and formed a "League of Gileadites," sworn to stand by each other in the rescue of fugitive slaves.

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In 1854 Kansas had become, in the eyes of both South and North, the decisive battle ground of the two systems, and five of Brown's sons living in Ohio set out thither to swell the free-soil ranks; they settled a few miles from Ossawatimie, and Brown joined them in October 1855, against his intention. The family were among the most stalwart defenders of the Territory for the next two years against the fraud and terrorism by which the Border Ruffians plunged it into anarchy and bloodshed. John Brown's career there brought him into national prominence, from the conspicuousness of the stage rather than the magnitude of the actions. Its most dramatic incidents were the retaliatory murder of five pro-slavery men at Pottawatomie, 24 May 1856, the capture of Capt. Pate at Black Jack, 2 June, and the magnificent defense of Ossawatimie against a crushing force of Missourians in August. It has never been narrated, even by Northerners without sympathy for the slavery cause except with strong partisan bias pro or con, and from its very nature, it probably never can be. The judgment passed on it depends not merely on the view taken of his cause (of which an impartial estimate is not impossible), but on the questions whether that cause would have succeeded in any event, and whether he helped or harmed it. No proof of either is possible, and favor or disfavor toward fanatical enthusiasts is one of the deepest lines of cleavage among human spirits. As the victory for freedom was won, it is the fashion to assume that it never was in doubt; that active warfare was needless; that the influx of free settlers would soon have caused the pro-slavery invaders to desist in despair; that Brown acted as a lawless ruffian who justified the other party, and that he only discredited and hampered his own side. But it is still quite rational to maintain the older view, of which the premises are certainly correct, whatever the deduction may be. The pro-slavery party had no such illusions; from the first they openly proclaimed the struggle for Kansas a war for life or death, and carried it on by the machinery of war. They constituted a government by open fraud and maintained it by open violence; sacked towns, burnt houses, assassinated some of their opponents, and illegally imprisoned others; while the United States courts dispersed their foes by legal anathema, and the United States troops acted as their army. If no resistance had been offered, it is not apparent why these methods should have been less employed or less successful in 1858 than in 1856; the prize would not have been less and the incentive would have grown greater. It is certain that such peaceful submission of the free-soilers would have been hailed by the Pierce and Buchanan parties as proof incontestable that the Republican charges of illegality and outrage were mere libels. It is therefore at least arguable that it was Brown, Montgomery, Lane, and the other fighters, by their stubborn and "lawless" defiance to sheer foreign conquest, plunging Kansas into open and bloody anarchy, who shamed the government into withdrawing its help to the invaders, and convinced the slavery party that force was no longer available. Incidentally, they gave the non-combatants a free community in which to decry their champions.

Whatever may be the judgment now, the Eastern abolition leaders at that time had no

thought of suppressing him: they furnished him some moneys and supplies for whatever plan he privately deemed best, feeling sure at least of some bold heartening stroke for the cause. For many years he had entertained the project of establishing, in the Maryland or Virginia mountains, a stronghold for fugitive slaves, where they could withstand attacks and if necessary reach Pennsylvania. He thought the knowledge of this refuge might stimulate the slaves into a dash for freedom, and the insecurity of slave property might drive the South into emancipation. That he could suppose the United States would allow such a guerrilla fortress and firebrand within his jurisdiction for a day, seems scarcely compatible with sanity, but Brown was insane only as all religious, intense idealists tend to become so. At the last, his plan developed into one for a stroke that should startle the country into action, draw recruits to him, and leave no chance for compromise or delay. Characteristically, he seems not to have doubted that the country would stand by him. He chose to assault the United States arsenal at Harper's Ferry, thus not only securing arms for his presumed fugitives, but making the country ring; without reflecting that this was open war against the nation, and that even the abolitionists could not uphold him. In 1857 he began drilling a small band of adherents at Tabor and Springfield, Iowa, but his trusted drillmaster, Forbes, gave the alarm, and the scheme was postponed. At length, in June 1859, he and some of his men hired a farm near Harper's Ferry, and two of his women came to keep house there; he gradually collected the remainder, 22 men besides himself, with some arms; and late Sunday evening, 16 October, with 18 men, seized the armory and took possession of the village. He made hostages of some leading citizens, and had a few neighboring planters and their slaves brought in. But the remaining citizens armed themselves, assailed and shot several of Brown's men, and surrounded the rest, and on Monday evening Col. Robert E. Lee came from Washington with a company of marines, and cooped Brown and his six remaining men into the engine-house. Brown fought there till the two sons with him were killed, and himself supposed to be mortally wounded, before he would surrender. Why he had not retreated to the mountains on capturing the arsenal was never explained, even by himself. He was tried before a Virginia court, but defended by Massachusetts counsel, sentenced as was inevitable and just, and hanged at Charlestown, W. Va. His testimony on the trial, and his demeanor and language all through, produced an ineffaceable impression on the North, revealing a character of heroic simplicity, purity, and grandeur; if his action was mad, he himself was not; and even his adversary, Gov. Wise, of Virginia, admired his "clear head, courage, fortitude, and simple ingenuousness," and felt him to be wholly truthful. The actual importance of the Harper's Ferry raid, in determining or hastening secession, has always been exaggerated, by his friends as praise and by his foes as detraction: to suppose that secession would not have come after Lincoln's election, had there been no such raid, is to ignore all American history for many years previous. But the revolt of the slave power seemed to justify his prevision and action; he became the popular

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incarnation of the spirit of liberty, its great pioneer and martyr; and the slogan of the North was: "John Brown's body lies a-mouldering in the grave, but his soul goes marching on!" His nature had something of the sublime; and great natures have their function and service as well as great intellects. No community could exist with such men for statesmen; perhaps none can be great without some such men for prophets.

Brown, John, Scottish physician and essayist, son of John Brown (1784-1858 q.v.): b. Biggar, 22 Sept. 1810; d. Edinburgh, 11 May 1882. He graduated in 1833 and began practice as a physician. His leisure hours were devoted to literature, many of his contributions appearing in the 'North British Review,' 'Good Words,' and other periodicals. His collected writings, published under the title of 'Horæ Subsevivæ, (leisure hours) (1858-82), embrace papers bearing on medicine, art, poetry, and human life generally. Several of his sketches, such as 'Rab and His Friends,' 'Our Dogs,' 'Pet Marjory,' 'Jeems the Doorkeeper,' on which his fame chiefly rests, have been published separately. Humor, tenderness, and pathos are his chief characteristics. See Peddie, 'Recollections of Dr. John Brown' (1893).

Brown, John George, Anglo-American painter: b. Durham, England, 11 Nov. 1831. He was educated in the common schools in Newcastle-on-Tyne, and came to the United States in 1853. He studied in the schools of the National Academy of Design; was elected an academician in 1863; received honorable mention at the Paris Exposition in 1899; and in 1900 was president of the American Water Color Society. He is best known for his pictures of bootblacks and street urchins. Among his famous pictures are: 'A Merry Air with a Sad Heart'; 'The Stump Speech'; 'The Passing Show'; 'Be Mine'; and 'Training the Dogs.'

Brown, John Hamilton, American inventor: b. Liberty, Maine, 28 July 1837. At the age of 18 he was apprenticed to a gunsmith and in 1857 entered business in Haverhill, Mass. He served in the Civil War as a sharpshooter, and in 1882 was a member of the American Rifle Team at Wimbledon. He began in 1883 to perfect the invention of a weapon for military use later known as the Brown segmental wire-wound gun, which, after numerous government tests, was pronounced a success.

Brown, John Howard, American editor: b. Rhinebeck, N. Y., 8 Nov. 1840. After studying law in New York and engaging in journalism in Washington, D. C. and Augusta, Ga., he became a publisher in New York. In 1896 he removed to Boston to become editor-in-chief of 'Lamb's Biographical Dictionary of the United States.' He is the author of 'American Naval Heroes' (1898), and of numerous contributions to periodical literature.

Brown, John Lewis, French artist: b. Bordeaux, 16 Aug. 1829; d. 1892. He studied under Belloc and Roqueplan and was famous as an impressionist painter of military and hunting scenes, as well as of studies of horses and dogs. Among his numerous works are: 'Steeple Chase' (1861); 'At the Outposts' (1865); 'Relay of Omnibus Horses' (1884); 'Hohenlin-den' (1887).

Brown, John Newton, American Baptist clergyman: b. New London, Conn., 29 June 1803; d. 1868. He studied at what is now Colgate University, Hamilton, N. Y., and filled successive pastorates at Buffalo, N. Y.; Providence, R. I.; Malden, Mass.; and Exeter, N. H. While at Exeter he commenced his literary labors by editing the 'Encyclopædia of Religious Knowledge' (1835). In 1838 he became a professor of exegetical theology and ecclesiastical history in the New Hampton theological institution, N. H., where he remained till 1845. He edited 'The Christian Chronicle and National Baptist' (1849-68), and was the author of 'The New Hampshire Confession' (1852).

Brown, John W., American author: b. Schenectady, N. Y., 21 Aug. 1814; d. Malta, 9 April, 1849. He graduated at Union College in 1832, and was settled as an Episcopal minister at Astoria, N. Y. In 1845 he became editor of the 'Protestant Churchman.' He was the author of the 'Christmas Bells, a Tale of Holy Tide, and Other Poems,' and of several prose tales of a religious character.

Brown, John Young, American lawyer: b. Claysville, Hardin County, Ky., 28 June 1835. He graduated at Center College, Danville, 1855, studied law, and was admitted to the bar. In 1859 he was elected to Congress, but not having attained the constitutional age, could not take his seat. He was again elected to Congress in 1868, but his seat was refused him by the House because of political disabilities. Finally he served in Congress (1873-7) and was placed on various committees. He retired to the practice of law and during 1891-5 he was Democratic governor of Kentucky.

Brown, Joseph Emerson, American statesman: b. Pickens County, S. C., 15 April 1821; d. Atlanta, Ga., 30 Nov. 1894. He was educated at Calhoun Academy, and graduated at Yale in 1846. He settled in Canton, Ga.; served in the State legislature, and was elected governor in 1857; serving three terms. As war governor he opposed Jefferson Davis in the matter of the conscription laws and raised 10,000 recruits to oppose Sherman's march to the sea; but would not allow them to leave the State. After the war he gave hearty support to the reconstruction measures, and supported Gen. Grant for the presidency. He was Chief-Justice of Georgia in 1868, and United States Senator in 1880-91.

Brown, Lancelot, English landscape gardener, sometimes called "Capability Brown": b. at Kirkharle, 1715; d. 1773. He commenced life as a kitchen gardener, but, by his industry and genius, rose rapidly in public estimation till he came to be regarded as a kind of oracle in taste in regard to all rural improvements, agricultural, horticultural, and even architectural. His extensive employment enabled him to realize a handsome independence, and he adorned the station to which he had worked his way with more graces and virtues than are often displayed by those who have been born to it. He obtained the dignity of high sheriff of Huntingdon in 1770. He avoided the stiff formality of the older landscape gardens, but is charged with having often sinned against good taste by endeavoring to reform natural scenery, and force it, under all circumstances, to assume

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the form of clumps, belts, and serpentine canals. His architectural performances are less remarkable for their exterior than for their interior, and have been regarded as models of convenience and comfort.

Brown, Nicholas, American merchant and philanthropist: b. Providence, R. I., 4 April 1769; d. there, 27 Oct. 1841. He graduated at Brown University, 1786. Through the death of his father in 1791, he inherited a handsome fortune, formed a partnership with his brother-in-law, Thomas P. Ives, and became one of the most successful and best-known merchants of America. He was a nephew of John Brown (1736-1803, q.v.). He possessed an accurate knowledge of the needs and resources of his own country, as well as of those others to which his trade extended, and this, added to his intimate knowledge of the European and American merchant marine service, enabled him to conduct far-reaching operations with a prospect of success amounting to certainty. In 1792 he gave \$500 to Brown University with which to purchase law books. This was the beginning of a long series of endowments and benefactions to that institution, which took its present name in honor of him in 1804, when he endowed a professorship of oratory and *belles-lettres*. In 1822 he built Hope College, at an expense of \$20,000; Manning Hall in 1834, at a cost of \$18,500; and a president's house in 1840, costing \$7,000. The total of his various gifts amounted to \$160,000. He was a trustee from 1791 to 1825; a fellow, 1825-41, and a most efficient treasurer from 1796 to 1825. He was also a generous donor to the Providence Athenæum and Butler Hospital for the Insane. He served several terms in the State legislature, and in 1840 was a presidential elector.

Brown, Oliver Madox, English artist, son of Ford Madox Brown (q.v.): b. 1855; d. 1874. From early boyhood he showed remarkable capacity both in painting and literature, especially prose fiction and poetry. His two most promising pictures were 'The Tempest—Prospero and the Infant Miranda' (exhibited in 1871 at the International Exhibition, South Kensington), and 'A Scene from Silas Marner' (1872). 'Gabriel Denver' (1873), and some other unfinished novels, besides sonnets and other poems, show wonderful literary power in one so young. His 'Literary Remains' were published in 1876.

Brown, or Browne, Robert, English clergyman, the founder of a religious sect first called "Brownists," and afterward "Independents": b. Toilethorpe, Rutlandshire, about 1550; d. Northampton, about 1633. He studied at Cambridge, from whence, in 1572, he removed to London. Here he supported himself by teaching; but soon returned to Cambridge and began openly to attack the government and liturgy of the Church of England as anti-Christian. He first ascended the pulpit at Norwich in 1581, where he succeeded in converting a number of Dutch, who had a congregation there, to his opinions. He then went to Middleburg, in Holland, with his followers, and wrote a book called 'A Treatise of Reformation without Tarrying for any Man.' In 1586 he returned to England, and, as he still labored to gain converts, was excommunicated by the Bishop of Peterborough. This censure, joined perhaps

with the evaporation of his zeal, induced him to submit, and in 1586 he became master of Stamford Grammar School, a post which he occupied till 1590, when he was presented to the living of Acworth, in Northamptonshire. He died in Northampton jail, where he had been sent for assaulting a constable. The sect of Brownists, far from expiring with their founder, soon spread so as to become a subject of great alarm; and a bill was brought into Parliament which inflicted on them very severe pains and penalties. In process of time, however, the name Brownists was merged in that of Congregationalists, or Independents, under the latter of which titles they formed a powerful party in the commonwealth.

Brown, Robert, Scottish botanist: b. Montrose, 21 Dec. 1773; d. London, 10 June 1858. He finished his education in 1795, when he became ensign and assistant surgeon in a Fife-shire fencible regiment, which he accompanied to Ireland, remaining there till 1800. He was then, through the influence of Sir Joseph Banks, appointed naturalist to Capt. Flinders' surveying expedition to Australia or New Holland. The whole continent of Australia was circumnavigated, the coast at various points examined, and Brown remained in the colony, visiting various parts of New South Wales and Van Diemen's Land, till 1805. He returned with nearly 4,000 species of plants, was shortly after appointed librarian to the Linnæan Society, and was now able to devote himself to the systematic study of his plants. He continued to make the result of his investigations known in communications to the Linnæan and Royal societies. One of his earliest papers was on a group of the family of plants named by Jussieu *Apocynæ*, which he succeeded in establishing as a separate family under the title already given them by Jussieu of *Asclepiadeæ*. In 1810 he published the first volume of the great work he had been preparing on the plants of Australia and Tasmania, entitling it 'Prodromus Floræ Novæ Hollandiæ et Insulæ Van Diemen.' No second volume of it ever appeared. He was the first English writer on botany who adopted the natural system of classification which has since entirely superseded that of Linnæus. In 1814 he published a botanical appendix to Capt. Flinders' account of his voyage, entitled 'General Remarks, Geographical and Systematical, on the Botany of Terra Australis.' In 1828 he published a brief 'Account of Microscopical Observations on the Particles Contained in the Pollen of Plants, and on the General Existence of Active Molecules in Organic and Inorganic Bodies.' He was the first to call attention to the presence of these active molecules. The movement of the granules of the fovilla (or semi-fluid matter contained in the pollen grains) which he believed to be purely physical, or non-organic, has on the Continent acquired the name of the Brownian or Brunonian movement. He also wrote botanical appendices for the voyages of Ross and Parry, the African exploration of Denham and Clapperton and others, and described, with Dr. Bennet, the plants collected by Dr. Horsfield in Java. In 1810 he received the charge of the collections and library of Sir Joseph Banks, which were afterward bequeathed to him for life. He transferred them in 1827 to the British Museum, and was appointed

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keeper of botany in that institution. He became a Fellow of the Royal Society in 1811, D.C.L. of Oxford in 1832, a foreign associate of the French Academy of Sciences in 1833. He had the Copley medal in 1839, and was appointed president of the Linnæan Society in 1849. He also received the decoration of the highest Prussian order of civil merit, presided over by Baron Humboldt, who called him *Botanicorum facile princeps*. As a botanist Brown occupied the very highest rank. He made the microscope and the study of development the basis of his classification; and by his skill in the application of ascertained facts to the elucidation of obscure and the explanation of doubtful phenomena, greatly advanced our scientific knowledge of the vegetable kingdom. His influence extended to other observers, and even to other departments of science. His works, contained chiefly in the 'Transactions' of learned societies and other inaccessible forms, are not of a nature to be popular. A collection of them is well known in Germany; and many of his papers have also been printed in England by the Ray Society (1866-7).

Brown, Robert, Scottish scientist: b. Campster, Carthness-shire, 1842; d. 1896. He explored the coast of Spitzbergen, Greenland, and the western shore of Baffin Bay in 1861, made charts of the interior of Vancouver, and with Wympier, in 1867, made discoveries as to the inland ice of Greenland, since borne out by those of Peary. He traveled extensively in the Barbary States, lectured on scientific themes in Glasgow and Edinburgh, and was a member of learned societies in Europe and America. After 1876 he lived in London, engaged in literary pursuits. He published 'Manual of Botany' (1874); 'Peoples of the World' (1882-5); 'Science for All' (1877-82).

Brown, Sir Samuel, English engineer: b. London, 1776; d. Blackheath, Kent, 15 March 1852. After serving with honor in the English navy he was made a retired captain in 1842. He is remembered for his system of making iron chain cables, and as the designer and builder of the earliest iron suspension bridge in England, at Berwick-on-Tweed. The famous chain pier was designed by him. He was knighted in 1838.

Brown, Samuel, Scottish chemist and poet: b. Haddington, 23 Feb. 1817; d. Edinburgh, 20 Sept. 1856. He graduated from the University of Edinburgh with extraordinary attainments, began his public career by delivering, in 1840, in association with his intimate friend, Edward Forbes, a course of lectures on the philosophy of the sciences, and having established among his auditors, as he had before among his teachers, the conviction that he was destined to great achievement, renounced all else that he might have won, to devote himself to the slow experimental realization of a great scientific conception. In 1849 he delivered in Edinburgh a series of lectures on the history of chemistry, tracing its progress from its playful childhood among the Greeks, through the Oriental and Medieval alchemists, with most fascinating sketches of Roger Bacon and Paracelsus; passing thence through the epoch of Stahl and Priestley, till the young and unfortunate Lavoisier changed the whole form of chemical science, opening a new path to all succeeding philoso-

phers. In 1850 he published the 'Tragedy of Galileo,' containing passages of great beauty, but said to be much inferior to his impromptu conversations on the character and doom of the great astronomer. Many of his lectures and essays have been collected since his death, under the title of 'Lectures on the Atomic Theory, and Essays Scientific and Literary.'

Brown, Samuel Gilman, American educator and clergyman: b. North Yarmouth, 4 Jan. 1813; d. Utica, N. Y., 4 Nov. 1885. He was graduated from Dartmouth College, 1831, and Andover Theological Seminary 1837; was professor at Dartmouth 1840-67, and president of Hamilton College, Clinton, N. Y., 1867-81. He was the author of 'Biographies of Self Taught Men' (1847); 'Life of Rufus Choate' (1862).

Brown, Samuel Robbins, American missionary in China and Japan: b. Connecticut, 1810; d. 1880. After graduating from Yale in 1832 and studying theology in Columbia, S. C., he taught in the New York Deaf and Dumb Institution 1834-8, going, in the last-named year, to Canton, where he begun the first Protestant school in China. After several years spent in pastoral work in western New York he went to Japan in 1859 and established a school in Yokohama. He helped to found the Asiatic Society of Japan, and for 20 years was prominent in Japanese life. He published 'Colloquial Japanese' (1863); 'Prendergast's Mastery System Adapted to the Japanese'; 'A Maker of the New Orient'; etc.

Brown, Sanger, American physician: b. Bloomfield, Ontario, 16 Feb. 1852. He was graduated from the Bellevue Hospital Medical College, New York, 1880, and has since held several important professional posts, becoming professor of neurology in the Post Graduate Medical School of Chicago in 1890. He was the earliest to demonstrate that the occipital lobe is the centre of vision in monkeys.

Brown, Thomas, English poet and miscellaneous writer, described by Addison as "of facetious memory": b. Shifnal, Shropshire, 1663; d. London, 1704. He was the author of numerous dialogues, letters, poems, etc., witty, coarse, and indelicate, first collected in 1707.

Brown, Thomas, Scotch metaphysician: b. Kirkmabreck, Kirkcudbright, 9 Jan. 1778; d. London, 2 April 1820. He was educated at the University of Edinburgh, where he obtained the professorship of moral philosophy. He distinguished himself, at a very early age, by an acute review of the medical and physiological theories of Dr. Darwin, in a work entitled 'Observations on Darwin's Zoonomia,' and published some indifferent poems which were collected in 1820. But he chiefly deserves notice on account of his metaphysical speculations, his chief work being 'Lectures on the Philosophy of the Human Mind' (1822). His system reduces the intellectual faculties to three great classes—perception, simple suggestion, and relative suggestion, employing the term suggestion as nearly synonymous with association. He held original views in regard to the part played by touch and the muscular sense in relation to belief in an external world. His development of the theory of cause and effect was first suggested by Hume.

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Brown, Thomas Edward, English poet: b. Isle of Man, 1830; d. Clifton, England, 29 Oct. 1897. After a brilliant career at Christ Church College, Oxford, he became assistant master at Clifton College, Bristol, in 1862, resigning in 1892. His work, though strong and remarkably original, failed to attract general attention during his lifetime, but when collected in 1900, contemporaneously with two volumes of his 'Letters,' they drew forth extended notices from leading critical reviews and journals in England and the United States. His poems, which are written in Anglo-Manx dialect for the most part, are chiefly narrative, and include 'Betsy Lee' (1873); 'Toic's'le Yarns, including Betsy Lee' (1881) 'The Doctor and Other Poems' (1887); 'The Manx Witch and Other Poems' (1889); 'Old John and Other Poems' (1893).

Brown, Sir William, English merchant and philanthropist: b. Ballymena, Ireland, 1784; d. 1864. In 1800 he removed with his parents to Baltimore, Md., and became the partner of his father in the linen trade there. In 1809 he set up a branch of the business in Liverpool and subsequently founded the famous mercantile house of Brown, Shipley & Company. He sat in Parliament four years from 1846, advocated free trade and decimal coinage, gave \$200,000, in 1857, to establish a free public library in Liverpool, and built the original library buildings and museum there.

Brown, William Garrett, American writer: b. Marion, Ala., 24 April 1868. He graduated at Harvard in 1891, taking highest honors in history, and became assistant in the Harvard Library. In 1892 he took an active part in the presidential campaign, serving on various committees and stumping Massachusetts in behalf of Cleveland. He has made a special study of Southern history, and since 1900 has devoted himself to writing and lecturing on this topic, contributing chiefly to the 'Atlantic Monthly.' His writings in book form are: 'Andrew Jackson' (1900); 'History of Alabama' (1901); 'The Lower South in American History' (1902); 'Stephen A. Douglas' (1902); 'Golf' (1902); 'History of the United States Since the Civil War' (1903); 'A Gentleman of the South' (1903).

Brown, William Montgomery, American Protestant Episcopal bishop: b. Orrville, Ohio, 6 Nov. 1855. He entered the Episcopal ministry, became archdeacon of Ohio in 1891, and in 1898 was consecrated coadjutor bishop of Arkansas in 1898; becoming bishop of that diocese in the year following. He has published 'The Church for Americans.'

Brown-Séquard, Charles Edouard, shärl ä-doo-är brown-sä-kär, Franco-American physiologist and physician: b. Mauritius, 1818; d. Paris, 1 April 1894. His father was a sea captain from Philadelphia, who married on the island a lady named Séquard. The son studied in Paris and graduated M.D. in 1846. He devoted himself mainly to physiological research, and received numerous prizes, French and British, for the results of valuable experiments on blood, muscular irritability, animal heat, the spinal cord, and the nervous system. In 1864 he became professor of physiology at Harvard, but in 1869 returned to Paris as professor of pathology in the School of Medicine. In 1873 he

became a medical practitioner in New York, treating especially diseases of the nervous system; and in 1878 succeeded Claude Bernard as professor of experimental medicine at the Collège de France. He repeatedly lectured in England. His publications include lectures on 'Physiology and Pathology of the Nervous System' (1860); on 'Paralysis of the Lower Extremities' (1860); and on 'Nervous Affections' (1873).

Brown, the color produced when certain substances—wood or paper, for example—are scorched or partially burned. Brown is not one of the primary colors in a spectrum. It is composed of red and yellow, with black, the negation of color. It is also the name of a genus of colors, of which the typical species is ordinary brown, tinged with grayish or blackish. The other species are chestnut brown, deep brown, bright brown, rusty, cinnamon, red brown, rufous, glandaceous, liver-colored, sooty, and lurid.

Brown Bear. See BEAR, BROWN.

Brown Bess, a name familiarly given to the old government regulation bronzed flintlock musket formerly used in the British army.

Brown Coal, a mineral nearly resembling coal, and formed like it of vegetable remains, but more woody or fibrous in its formation. It usually belongs to later formations than the common coal, and on this account has been called modern coal. Brown coal is at first hardly to be distinguished from common coal, but it has a brown streak when scratched, and when exposed to the air rapidly deteriorates, falling to powder in a few months, while the kind called lignite tears and splits. Brown coal contains much more water than common coal, and is thus less valuable as fuel. Where better fuel is scarce, however, it is largely used. See LIGNITE.

Brown Spar, a name given to some crystallized varieties of dolomite tinged with peroxide of iron.

Brown Thrush. See THRUSH, BROWN.

Brown University, an educational institution in Providence, R. I. Its charter was granted by the General Assembly of the State in 1764 and the institution was opened in Warren in 1765, as Rhode Island College. Its founding was due to the wish of the Baptists to have a college under their own control and it has ever since been affiliated with the Baptist Church, although remaining unsectarian. The college was removed to Providence in 1770, and in 1804 its name was changed to Brown University in honor of Nicholas Brown (q.v.), whose various gifts to the college were not far from \$160,000 in amount. Under its fourth president, Francis Wayland (q.v.), 1827-55, the university was practically reorganized. Under President Elisha Benjamin Andrews (q.v.), 1880-98, the number of students increased from 268 to 864. In 1891 the Woman's College was founded, and in 1897 this was accepted by the corporation as the Woman's College in Brown University. Since the presidency of the Rev. W. H. P. Faunce began in 1899, the institution has grown more rapidly than ever before: a \$2,000,000 endowment has been secured; and several large and important buildings have been erected, including the Lyman Gymnasium, and the John Carter Brown Library. In the northwest corner

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of the front campus will shortly be erected a clock tower 100 feet high with dial and chime of bells, the gift of Paul Banjotti of Turin, Italy, Italian consul-general at Liverpool, in memory of his wife, who was a Miss Brown of Providence.

Browne, Charles Farrar ('ARTEMUS WARD'), American humorist: b. Waterford, Me., 26 April 1834; d. Southampton, England, 6 March 1867. He learned the printer's trade, and while working on the *Carpet Bag*, a Boston comic weekly, began his career as one of the most widely popular of American writers and lecturers. 'Artemus Ward's Sayings,' written for the Cleveland *Plain Dealer*, extended his fame as a clever and witty writer. His humorous lectures, especially those on Mormonism, proved most successful in this country and in England. He died of consumption while on a lecture tour in the latter country. Browne's humor had a quality of its own, and was essentially democratic and American. His winning personality never failed to put an audience in a receptive mood. His works in book form are: 'Artemus Ward: His Book' (1865); 'Artemus Ward: His Travels Among the Mormons' (1865); 'Artemus Ward: His Book of Goaks' (1865); 'On the Rampage' (1865); 'Artemus Ward Among the Fenians' (1865); 'Artemus Ward in London' (1867); 'Artemus Ward's Lecture at Egyptian Hall' (1869). While in England he made several contributions to 'Punch,' beginning with the number for 1 Sept. 1866. Compare M. D. Landon's biographical sketch, prefixed to 'Artemus Ward, His Works Complete' (1875).

Browne, Charles Francis, American artist: b. Natick, Mass., 21 May 1859. He studied at the Boston Art Museum, the Philadelphia Academy of Fine Arts, and the Paris Ecole des Beaux Arts. He has been for some years lecturer and instructor in the history of art in the Chicago Art Institute, and has exhibited both in this country and Europe.

Browne, Edward Granville, English Orientalist: b. Uley, England, 7 Feb. 1862. He was educated at Eton and Pembroke College, Cambridge. He traveled in Persia (1887-8), becoming lecturer in Persian at Cambridge in the year last named. He has published 'A Traveler's Narrative, Written to Illustrate the Episode of the Báb,' Persian text and English translation with notes (1891); 'The New History of Mirzá and Ali Muhammad the Báb' (1893); 'A Year Amongst the Persians' (1893).

Browne, Edward Harold, English prelate: b. Aylesbury, Buckinghamshire, 6 March 1811; d. Winchester, Hampshire, 19 Dec. 1891. He was educated at Emmanuel College, Cambridge, took orders in the Anglican Church in 1836, and was consecrated Bishop of Ely in 1864. In 1873, he was transferred to Winchester, resigning this bishopric in 1891. He was a prominent advocate of the old Catholic movement in Germany and one of the Old Testament company of revision of the King James version of the Bible. He published 'An Exposition of the XXXIX. Articles' (1850-3); 'Sermons on the Atonement and Other Subjects' (1859); 'The Messiah Foretold and Expected' (1862); 'The Pentateuch and the Elohist's Psalms in Reply to Bishop Colenso' (1863); 'The Stripe, the Victory, and the Kingdom' (1872); 'Position

and Parties of the English Church' (1875); 'Commentary on Genesis' in the 'Speaker's Commentary.'

Browne, Frances, Irish poet: b. Stranorlar, Donegal, Ireland, 16 June 1818. When she was 18 months old she lost her sight from smallpox. From her brothers and sisters attending the village school she obtained as much information as they were acquiring, and listened to such books as they would read to her. 'Robinson Crusoe' and 'Mungo Park's African Adventures' were among these works. The prose writings of Sir Walter Scott, with which she became familiar from their being read to her, deeply influenced her mind. In 1841 she commenced contributing verse to the 'Athenæum,' edited at that time by Mr. T. K. Hervey. He became interested in her story, related it with considerable effect in the 'Athenæum,' paid her for her writings, and introduced her to other publications, from which she also derived pecuniary benefits. In 1844 the 'Star of Atteghel' and other poems appeared in a small volume, which was well received. Among the advantages accruing to the poet from it, was her being placed on the pension list for £20 a year by Sir Robert Peel, prime minister.

Browne, Francis Fisher, American editor and author: b. South Halifax, Vt., 1 Dec. 1843. During the Civil War he served in the 36th Massachusetts Volunteers. He edited the 'Lakeside Monthly,' 1869-74, and in 1880 became editor of 'The Dial,' Chicago, which under his direction has come to be one of the two or three American literary journals worthy of being ranked with the best English periodicals of similar scope. Publications: 'Every-day Life of Abraham Lincoln' (1886); 'Volunteer Grain' (1896), poems. He has edited 'Golden Poems by British and American Authors' (1881); 'Golden Treasury of Poetry and Prose' (1883); 'Bugle Echoes: a Collection of Poems of the Civil War' (1886).

Browne, George Forrest, English bishop: b. York, England, 1833. He was educated at St. Catharine's College, Cambridge, and ordained 1858. He was appointed theological tutor and bell lecturer in ecclesiastical history in the Episcopal Church of Scotland, 1862; fellow and lecturer at St. Catharine's, 1863-5; secretary and chief organizer of the Cambridge local examinations. He was rector of Ashley, 1869-75; Disney professor of archaeology, 1887-92; canon of St. Paul's, 1891-7; bishop of Stepney, 1895-7, whence he was transferred to the see of Bristol. He is the author of 'Ice Caves of France and Switzerland' (1865); 'The Venerable Bede' (1879); 'University Sermons' (1878-80); 'The Ilam Crosses' (1880); 'Early English Church History' (1893); 'The Church at Home Before Augustine' (1894); 'Augustine and His Companions' (1895); 'Conversion of the Heptarchy' (1896); 'Theodore and Wilfrid' (1897); 'History of St. Catharine's College' (1902); 'Life and Works of St. Aldhelm,' and various publications of the Church History Society (1894-7).

Browne, George Waldo, American author: b. Deerfield, N. H., 8 Oct. 1851. For five years he edited 'American Young Folks,' and is a well-known writer for young people. He has written over 100 serials and several hundred short stories and articles for the leading juve-

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nile periodicals. Of his books the best known are: 'The Woodranger' (1899); 'Two American Boys in Hawaii' (1899); 'Pearl of the Orient' (1900); 'Legends of the Hills' (1901). His most recent juveniles include 'For Home and Honor' (1902); 'From Switch to Lever' (1902); 'Zip the Acrobat' (1902). He writes under the pseudonym of VICTOR ST. CLAIR.

Browne, Hablot Knight, English caricaturist, better known by his pseudonym of PHIZ: b. London, 15 June 1815; d. Hove, Brighton, 8 July 1882. He was educated at a private school, and at an early age began to draw caricatures with great spirit. In 1835 he succeeded Seymour as the illustrator of Dickens' 'Pickwick,' and so happy and successful was his pencil that he was engaged to illustrate 'Nicholas Nickleby'; 'Dombey and Son'; 'Martin Chuzzlewit'; 'David Copperfield,' and other works of that great novelist. He subsequently contributed many graphic illustrations to the novels of Lever, Ainsworth, Scott (the Abbotsford edition of the Waverley Novels), and to an illustrated edition of Byron, besides sending many comic sketches to the illustrated serials of the time. See Thompson, 'Life and Labors of H. K. Browne' (1884).

Browne, Isaac Hawkins, English poet: b. Burton-on-Trent, Staffordshire, 1706; d. 1760. He was educated at Trinity College, Cambridge, and called to the bar, but he did not practise. He wrote 'Design and Beauty'; 'The Pipe of Tobacco' (in which he imitates Pope, Young, Swift, and others); and a Latin poem, 'De Animi Immortalitate,' modeled on Lucretius and Virgil. The last-named received high commendation from the scholars of his time, and has been several times translated into English. Browne had a great reputation as a wit and conversationalist.

Browne, John Ross, American author and traveler: b. Ireland, 1817; d. Oakland, Cal., 9 Dec. 1875. He came to America when a child, his father settling in Kentucky. At the age of 18, having learned stenography, he went to Washington, and for several years was employed as shorthand reporter in the Senate. His desire for travel led him to take a whaling cruise, in the course of which he visited the greater part of the world. In 1849 he was a government commissioner in California, and reported the State Constitutional Convention proceedings. In 1851, and again in 1861, he traveled extensively in Europe and the Holy Land, visiting Iceland, Russia, Poland, and other countries. Commissioned by the government to study the mineral resources west of the Rocky Mountains, he presented an elaborate report, reviewing the mines, climate, topography, agriculture, commerce, etc., of that region. His books of travel were illustrated with humorous drawings of his own. He was United States minister to China in 1868-9. Publications: 'Etchings of a Whaling Cruise' (1846); 'Yusef: a Crusade in the East' (1853); 'Adventures in the Apache Country' (1869); 'The Land of Thor' (1866); 'Adventures of an American Family in Germany' (1867); 'Crusoe's Island, with Sketches of Adventures in California and Washoe' (1864); 'Resources of the Pacific Slope' (1869).

Browne, Junius Henri, American journalist: b. Seneca Falls, N. Y., 14 Oct. 1833; d. New York, 2 April 1902. He was a graduate of Saint

Xavier College, Cincinnati. In 1861 he became war correspondent for the New York *Tribune*, was wounded at Fort Donelson, and taken prisoner while engaged in an abortive expedition to run the Vicksburg batteries. After an imprisonment of 20 months in seven different prisons, he eluded his guard at Salisbury, N. C., traveled 400 miles through a hostile country, and reached the Union lines 14 Jan. 1865. His list of Union soldiers who died at Salisbury, published in the *Tribune*, is the only authentic account of their fate. After the War he served as correspondent of the New York *Tribune*, *Times*, and other journals, and contributed many articles to leading periodicals. His best-known works are: 'Four Years in Secessia' (1865); 'The Great Metropolis: A Mirror of New York' (1869); 'Sights and Sensations in Europe' (1872). A series of articles on women, which he wrote for the 'Galaxy,' created a sensation in literary circles.

Browne, Sir Thomas, English physician and writer of distinction: b. London, 19 Oct. 1605; d. 19 Oct. 1682. He practised as a physician for some time in Oxfordshire, and afterward visiting the Continent, received the degree of M.D. at Leyden. On his return to England he settled as a physician at Norwich, where he married and acquired extensive practice and reputation. In 1642 he published his famous work entitled 'Religio Medici,' which excited the attention of the learned not only in England, but throughout Europe, and was translated into various languages. In 1646 his literary character was still further exalted by the appearance of his 'Pseudodoxia Epidemica,' or 'Treatise on Vulgar Errors,' a work of extraordinary learning, and accounted the most solid and useful of his literary labors. Owing probably to his extent of practice, it was not until 1658 that his 'Hydrotaphia, or Treatise on Urn-Burial,' appeared, conjointly with his 'Garden of Cyrus.' In 1665 he was constituted an honorary member of the College of Physicians, and in 1671 King Charles II. conferred on him the honor of knighthood. Of a most amiable private character, he was singularly happy in the affection of his large family and numerous friends; and passed through a remarkably tranquil and prosperous literary and professional life. His 'Religio Medici' is in no way professional, but may be described as the beliefs of an individual upon morals, religion, and metaphysics. It is a curious production, and its extreme orthodoxy and submission to authority might in later days, at least in expression, be held ironical. He deems it "no vulgar part of faith to believe a thing, not only above but contrary to reason, even against the arguments of our proper senses." Fancy and feeling in fact predominated in him over judgment; he believed in the existence of guardian angels, the reality of witchcraft, and the appearance of spectres. He was, however, extremely benevolent, opposed to persecution, and frequently expatiates with a noble glow of language on subjects of charity and philanthropy. This work was much attacked, both at home and abroad, especially by the German divines, who, *more theologico*, treated a writer as an atheist and an infidel whose piety and reverence for authority were displayed in every page. The 'Treatise on Vulgar Errors' ably discusses the varying causes of error, which he examines with great strength of reasoning

and liberality of sentiment. His appropriation of one grand source of error to the machinations of Satan, however, may not appear very philosophical at present; and of course his own science being only that of the day, he is often astray in the department of natural knowledge. Still he displays a large and penetrating understanding on many points. His treatise on 'Urn-Burial,' composed on occasion of the discovery of some funeral urns in Norfolk, discovers some curious erudition on the subject of ancient and modern burial; and the tract called 'The Garden of Cyrus' is still more curiously learned and fantastical. He left some posthumous papers relative to antiquities, which appear in the folio edition of his works (1686). Dr. Johnson, who has written his life, and who is thought in some degree to have founded his own style upon that of Sir Thomas Browne's, has given a masterly description of his genius and tone of composition; in which he speaks highly of the exuberance of his knowledge and plenitude of his ideas; and in reference to his heterogeneous mixture of languages, observes that he who has uncommon sentiments to deliver may be allowed great liberty in his manner of expressing them. Coleridge has characterized Browne as "rich in various knowledge, exuberant in conceptions and conceits, contemplative, imaginative; often truly great and magnificent in his style and diction, though doubtless too often big, stiff, and hyperlatinistic." His works have been republished in three volumes in Bohn's Antiquarian Library. See Pater, 'Appreciations' (1889); Marshall, 'In the East Country with Sir Thomas Browne.'

Browne, Thomas Alexander (ROLF BOLDREWOOD), Australian romancer: b. London, England, 6 Aug. 1826. He is a son of Capt. Sylvester Browne, a founder of Melbourne, Australia. He was educated in Sidney College, and has written 'Ups and Downs: a Story of Australian Life' (1879); 'Robbery Under Arms: Life and Adventures in the Bush' (1888); 'A Squatter's Dream Story' (1890); 'The Miner's Right' (1890); 'A Colonial Reformer' (1890); 'A Sydney Side Saxon' (1891); 'A Modern Buccaneer' (1894); 'The Crooked Stick' (1895); 'The Sphinx of Eaglehawk' (1895); 'The Sealskin Cloak' (1896); 'My Run Home' (1897); 'Plain Living' (1898); 'A Canvas Town Romance' (1898); 'The Babes in the Bush' (1900); 'In Bad Company' (1901); 'Ghost Camp' (1902).

Browne, Ulysses Maximilian (COUNT VON), Austrian military officer: b. Basel, 23 Oct. 1705, of an Irish Jacobite family; d. 26 June 1757. He entered the Austrian service at the age of 12, and became one of the foremost field marshals in the army of Maria Theresa. As governor of Silesia (1739-42), he had to face the first of Frederick the Great's attacks, and in the Seven Years' War he commanded the Austrians at Lobositz (1756). He was mortally wounded at the battle of Prague.

Browne, William, English poet: b. Tavistock, Devonshire, 1591; d. Ottery Saint Mary, Devonshire, about 1643. He was educated at Oxford, and spent a quiet, tranquil life. His poetry is graceful and fanciful, and abounds in beautiful pictures of English scenery. Browne has always been much admired by the poets.

His chief work is 'Britannia's Pastorals' (1613-16). 'The Shepherd's Pipe' (1614) is a collection of eclogues, and 'The Inner Temple Masque' (1614-15) tells the story of Ulysses and Circe. His minor poems are very fine. The best modern editions are by Hazlitt for the Roxburghe Club, and by Gordon Goodwin, 'The Muse's Library.'

Browne, William George, English traveler: b. London, 25 July 1768; d. northern Persia, 1813. In several expeditions he traveled through Egypt and some parts of the interior of Africa, and through Asia Minor and Armenia. In 1812 he proposed a more extensive journey through central Asia. He had already, in 1813, arrived at Tabreez, on his way to Tartary, when his party was attacked by banditti and himself murdered. He was the author of 'Travels' in Africa, Egypt and Syria (1800).

Browne, William Hand, American author: b. Baltimore, 31 Dec. 1828. He studied medicine and graduated M.D. at the University of Maryland, but soon turned his attention to English literature, in certain departments of which he came to be an authority. He edited the 'Southern Review' (1867-8), and the 'Southern Magazine' (1870-5); he was librarian at Johns Hopkins University from 1879 to 1891, when he became professor of English literature. He has translated F. Spielhagen's 'Hammer and Anvil' (1870); Turgeneff's 'Spring Floods' (1874); and Falke's 'Greece and Rome' (1882). In collaboration with R. M. Johnston he wrote 'Historical Sketch of English Literature' (1872); and a 'Life of Alexander H. Stephens' (1878); with J. T. Scharf, 'History of Maryland' (1878); and with S. S. Haldeman he compiled 'Clarendon Dictionary: Concise Hand-Book of the English Language' (1882). He has also written 'George Calvert and Cecilius Calvert, Barons Baltimore'; 'Maryland: the History of a Palatinate' (1884); and has edited 'Archives of Maryland: Proceedings and Acts of the General Assembly, 1637-44' (1883); and 'Selections from the Early Scottish Poets.'

Browne, William Hardcastle, American lawyer and author: b. Philadelphia, 14 Nov. 1840. In 1865 he was admitted to the Philadelphia bar, where he has since practised, but he is best known for his legal and literary compilations, chief of which are: 'Digest of the Law of Divorce and Alimony in the United States' (1890); abridged editions of Blackstone's 'Commentaries' (1894); and Kent's 'Commentaries' (1895); 'Law of Negligence in Pennsylvania' (1896); 'Law on Decedents' Estates in Pennsylvania' (1897); 'Witty Sayings by Witty People' (1898); 'Odd Derivations of Words and Phrases' (1900); 'Waverley Novels,' abridged (6 vols. 1901), and others.

Brownell, Clarence Ludlow, American journalist and author: b. Hartford, Conn., 6 June 1864. He studied at Harvard University and Stevens Institute of Technology, and for five years was English instructor in government and private schools in Japan. For some years he has been a constant contributor of articles on Japanese life, etc., to American magazines and newspapers, and is steadily at work on a history of Japan and Buddhism in that country. He has written: 'Tales from Tokio' (1900).

Brownell, Franklin P., Canadian artist: b. New Bedford, Mass. He makes specialties of portraits and figure-painting. For some years he has been principal of the Ottawa Art School. His canvas, 'The Photographer,' is in the National Gallery at Ottawa.

Brownell, George Griffin, American educator: b. Fairfield, N. Y., 2 July 1898. He graduated at Syracuse University, 1893, and studied at the Sorbonne, Paris, 1893-4, and at Johns Hopkins University, 1894-8, when he was appointed professor of Romance languages at the University of Alabama. He wrote for *Harpers's Weekly* 'The Lone Star Republic' (1894), and 'The Vale of Andorra' (1895); he has edited for college use the Spanish texts 'El Capitán Veneno' (1901), and 'El Pájaro Verde' (1901); and has contributed frequently to 'Modern Language Notes' on subjects relating to the Romance languages and literatures.

Brownell, Henry Howard, American poet and historian: b. Providence, R. I., 6 Feb. 1820; d. East Hartford, Conn., 31 Oct. 1872. His first essay in poetry was a spirited versification of Farragut's 'General Orders' to the fleet below New Orleans. Afterward he was appointed to an honorary place on the Hartford, flagship, and had opportunity to observe actual naval warfare. In 'The Bay Fight' he describes, with truth and force, the battle of Mobile Bay. He collected and published his many occasional verses in 'Lyrics of a Day; or, Newspaper Poetry by a Volunteer in the United States Service' (1864).

Brownell, Thomas Church, American Protestant Episcopal bishop: b. Westport, Mass., 10 Oct. 1779; d. Hartford, Conn., 13 Jan. 1865. He was graduated from Union College, Schenectady, N. Y., in 1804. The next year he accepted the post of tutor in Latin and Greek in that institution; in 1807 was appointed to the chair of belles-lettres and moral philosophy; and in 1809 was chosen the first professor of chemistry and mineralogy. He entered the Episcopal ministry in 1816, and in connection with his professional duties gave himself to the work of a missionary in Schenectady. In 1818 he became an assistant minister in Trinity Church, New York. He was consecrated Bishop of Connecticut, 27 Oct. 1819, and removed at once to his new field of labor. During his long episcopate of 45 years, Bishop Brownell was actively and efficiently engaged in the duties of his station. Washington (now Trinity) College, at Hartford, Conn., took its rise under his auspices in 1824; and he became its first president, resigning in 1831. In 1852 he became presiding bishop in the American Episcopal Church. He published 'The Family Prayer Book' (1823); 'Religion of the Heart and Life' (1839-40); 'Consolation for the Afflicted'; 'The Christian's Walk and Conversation'; etc. A bronze statue of Bishop Brownell has been placed on the campus of Trinity College.

Brownell, William Crary, American essayist and critic: b. New York, 30 Aug. 1851. Having graduated from Amherst, he devoted himself to critical and editorial work in New York city. He became an editor of 'Scribner's Magazine', and among his writings are: 'French Traits: an Essay on Comparative Criticism' (1889); 'French Art' (1892); 'Newport' (1896); and other works.

Brownie, a spirit of goblin, in old popular superstitions of Scotland, supposed to haunt old houses, especially those attached to farms. He might be called the Robin Goodfellow of Scotland. In the night he helped the family, and particularly the servants, by doing many pieces of drudgery, performing domestic labors while the inmates of the household slept. If offered food or any other recompense for his services, he decamped and was seen no more.

Browning, Elizabeth Barrett, English poet: b. Durham, 6 March 1806; d. Florence, Italy, 29 June 1861. Her father, Edward Moulton, or Moulton-Barrett, as soon after her birth he began to write his name, was a country gentleman who resided at the foot of the Malvern Hills, and in this beautiful retreat Elizabeth's girlhood was passed. She early began to commit her thoughts to writing, and in 1826 appeared her volume entitled 'An Essay on Mind and Other Poems,' anonymously published. Viewed as the production of a young lady of 20, this book is indeed a remarkable one; but in after years its author was so dissatisfied with it that she omitted it in the collected editions of her poems. In 1833 appeared a translation by her of the 'Prometheus Bound,' of Æschylus. A collection entitled 'The Seraphim and Other Poems' was produced in 1838, the principal piece being a lyric drama shadowing forth the feelings and emotions which may be supposed to have been excited in an angelic being by the spectacle of the crucifixion. Both in this and in a subsequent work, 'The Drama of Exile' (1840), she chose for her theme the fall and redemption of man, subjects on which Milton had already employed his genius, and in the treatment of which, though exhibiting much grandeur and sublimity, Mrs. Browning can scarcely be said to have approached him. Always feeble in health, she was now nearly brought to the verge of the grave by the rupture of a blood vessel, and having been taken to Devonshire to promote her recovery, received there a severe shock from the drowning of a favorite brother. For several years she was confined to a darkened chamber, and saw only a few of her most intimate friends, but nevertheless continued to busy herself with study and composition. Her health was at length partially restored, and in 1846 she was married to Mr. Robert Browning, a gentleman already well known in the literary world as a poet and dramatist. After their union they went to Italy, and continued subsequently to reside for the most part in Florence. In 1850 a collected edition of Mrs. Browning's works appeared in two volumes, including several new poems, and among others 'Lady Geraldine's Courtship,' one of the finest of her productions, and remarkable, it is said, as having been composed in the incredibly short space of 12 hours. Her 'Sonnets from the Portuguese,' included in this volume, were written after her engagement, and first privately printed. They have no parallel for excellence in their peculiar kind in our literature. 'Casa Guidi Windows,' a poem on the struggles of the Italians for liberty in 1848-9, appeared in 1851. The longest and most finished of all her works, 'Aurora Leigh,' a romantic narrative and didactic poem in blank verse, was published in 1856. Her last volume, 'Poems Before Congress,' appeared in 1860, and cannot be said to have added greatly to her reputation.

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Several detached pieces of hers appeared from time to time in the 'Cornhill Magazine,' up to the period of her death. 'Last Poems,' by Mrs. Browning, published by Robert Browning in 1862, and 'Greek Christian Poets and the English Poets,' translations and essays of hers published by Mr. Browning in 1863, were followed in 1866 by his publication of 'Selections from the Poems of Elizabeth Barrett Browning' (2d series 1880). The 'Letters of E. B. Browning,' edited by Frederick G. Kenyon (1897), are a definitive presentation of her character and career in a selection from a very large mass of correspondence collected by Mr. Browning himself. It is a chronicle, and practically a life, by reason of the character of the letters and the addition of connecting links of narrative. The letters give an unusually full and interesting revelation of the course of her life. The poetry of Mrs. Browning is characterized by much pathos and depth of feeling, combined with great vividness and powers of description. It partakes eminently of the modern English school, as represented by Tennyson and others, at times obscure and transcendental, but animated throughout by the most noble and exalted sentiments, and illuminated from time to time by flashes which, in their bearings on the unseen world of mind and spirit, seem almost supernatural. In their married life she and Robert Browning found mutual happiness and help, the good influences of which are reciprocally manifested in their writings.

Browning, Orville Hickman, American politician: b. Harrison County, Ky., 1810; d. Quincy, Ill., 10 Aug. 1881. While performing the duties of clerk in the office of the county and circuit clerk of Bracken County, he pursued a course of classical studies at Augusta College. Admitted to the bar in 1831, he settled in practice at Quincy, Ill., where he subsequently resided. In 1832 he served through the Black Hawk war, and was a member of the Illinois legislature, 1830-43. In conjunction with Abraham Lincoln he organized the Republican party in Illinois at the Bloomington convention. When the Civil War broke out he warmly supported the government, and in 1861 was appointed to the United States Senate to fill the vacancy caused by the resignation of Stephen A. Douglas. President Johnson made him secretary of the interior in 1866, and for one year from March 1868 he also acted as attorney-general. In 1869 he was elected to the State Constitutional Convention, and after that he retired to the practice of his profession.

Browning, Oscar, English author: b. London, 17 Jan. 1837. He was educated at Eton and at King's College, Cambridge, where he was graduated with classical honors in 1860. From 1860 to 1875 he was a master at Eton, and since 1876 has been lecturer in history and political science at Cambridge. He has also served as principal of the University Training College for teachers, and in other educational capacities. Twice he has been an unsuccessful candidate of the Liberal party for Parliament. He is a voluminous writer on subjects of education, history, biography, etc., and among his works are: 'Cornelius Nepos' (1868); 'Netherlands in the 16th Century' (1869); 'Thirty Years' War' (1870); 'Modern England' (1879); 'Modern France' (1880); 'History of Educational

Theories' (1881); 'History of England' (1890); 'Life of George Eliot' (1890); 'Goethe: Life and Works' (1891); 'The Citizen: His Rights and Responsibilities' (1893); 'Life of Peter the Great' (1898); 'Wars of the 19th Century' (1899); 'History of Europe, 1814-43' (1901); 'Letters from India' (1902).

Browning, Robert, English poet: b. Camberwell, a suburb of London, 7 May 1812; d. Venice, 12 Dec. 1889. His father, Robert, who was a clerk in the Bank of England, and was himself a lover of books, a classical scholar and ready at versifying, had the boy educated in a school at Peckham, after which he attended lectures at University College. His father's family being dissenters, his mind was trained and his character formed under influences less peculiarly English than those to which youths are exposed in the great public schools and the two leading universities of that country. At the age of 20 he traveled on the Continent and resided for some time in Italy, where he made diligent study of the mediæval history of that country, so fruitful in themes for poetry such as his genius was to produce. In 1833 he published anonymously his first book, 'Pauline'; spent some months in Russia, in 1834; and in the following year issued 'Paracelsus,' a dramatic poem in five parts. In 1837, at the suggestion of Macready, he wrote the tragedy of 'Strafford,' which was produced at Covent Garden in May of the same year, with no marked success. His next poem, 'Sordello,' was printed in 1840, and the obscurity of its introspective subtleties injured the poet's reputation with the critics. Notwithstanding this, he published (1841-6) the 'Bells and Pomegranates' series, in which were included the three plays, 'Pippa Passes,' 'King Victor and King Charles,' and 'Colombe's Birthday'; the four tragedies, 'The Return of the Druses,' 'A Blot in the 'Scutcheon' (produced by Macready at Drury Lane in 1843), 'Luria,' and 'A Soul's Tragedy'; while among the lyrics were 'The Pied Piper of Hamelin,' 'How They Brought the Good News from Ghent to Aix,' and 'The Lost Leader.' In 1846 he married Elizabeth Barrett (q.v.), and settled with her in Florence, where they remained for nearly 15 years. During his residence there he published 'Christmas Eve and Easter Day' (1850), and 'Men and Women' (1855), the latter containing such characteristic poems as 'Andrea del Sarto,' 'Fra Lippo,' 'Childe Roland,' 'Evelyn Hope,' 'One Word More,' and 'Up at a Villa.' When the poet's wife died in 1861 he returned to London, and entered upon his richest literary period by publishing 'Dramatis Personæ' (1864). These dramatic monologues, of which there were 17, include 'Rabbi Ben Ezra,' 'Abt Vogler,' 'Prospice,' 'Caliban upon Setebos,' and 'A Death in the Desert.' Recognition of his literary fame, which came slowly, was made in 1867, when he was elected an honorary Fellow of Balliol, an M.A. of Oxford, and later an LL.D. of Cambridge. It was not, however, until 1869, that 'The Ring and the Book' was published, and this poem, which accentuates every characteristic of the poet, still remains his central achievement. The poem, which is epical in length if not in method, is the story of a murder told 10 times over in wide variety of intention by various persons connected with the tragedy. His next publication was the short poem of 'Hervé Riel,' the pro-

ceeds from which were devoted to the relief of Paris after the siege in 1871. Following this came 'Balaustion's Adventure' (1871), including a translation of Euripides' 'Alcestitis'; 'Prince Hohenstiel-Schwangau, Saviour of Society' (1871), an imaginary conception of how Louis Napoleon might justify his policy; 'Fifine at the Fair' (1872), in which the relations of the sexes are discussed; 'Red-Cotton Night-Cap Country' (1873), a story of love, penitence, and suicide, the scene of which is laid in Normandy; 'Aristophanes' Apology' (1875); 'The Inn Album' (1875), a story of a woman's wrongs; 'Pacchiarotto and Other Poems' (1876), in which 'Pacchiarotto, and How He Worked in Distemper' conveys an implication of Browning's own method in the poetic art; 'The Agamemnon of Æschylus' (1877); and 'La Saisiaz' (1878), in which immortality is discussed. As a kind of new departure he published a first set of 'Dramatic Idylls' (1879), and a second series (1880), of which the more important are 'Martin Relph,' 'Pheidippides,' and 'Ivan Ivanovitch.' The volumes which have followed are 'Jocoseria' (1883); 'Ferishtah's Fancies' (1884); 'Parleyings with Certain People of Importance in Their Day' (1887), and 'Asolando' (1889). The latter volume was published when the author was on his death-bed, and an account of its favorable reception was almost the last information he received. His body was brought from Venice to England, where, in national recognition of his genius, it was buried in Westminster Abbey between Cowley and Chaucer. In such fashion, and in ungrudging completeness, was his poetic greatness acknowledged at the last. Its too tardy recognition by the popular voice was largely due to the prevailing belief that poetry is for the mental dalliance of a lazy hour, and also to the persistency with which Browning had mocked at this belief in the athletic hardness of mind which he required in his readers. Moreover he seemed always inclined, to the dismay of the public, to press forward into service the superficial defects of his solid interior qualities. Thus, at times, his wide scholarship strayed off into pedantry; his secure skill in verse dropped ever and again into grotesque Bohemian robustness of phrase and rhyme; his swift intuitive glance into the problems of life seemed to create in him an artistic impatience of detail which, in the structure of his verse, became a thrifty brusqueness of expression tending toward cipher; and, above all, his most notable gift of analysis, his power to track the most hidden motive to its last retreat, seemed ever tending to lapse into an introspective subtlety akin to the cobwebberies of the schoolmen. Yet, aside from these occasional shortcomings, there remain his learning, his humor, his mastery of artistic expression, his immense range of sympathy, his spiritual insight, and the height and strength of his ideals to make him one of the greatest of modern poets.

Brownism. See BROWN, ROBERT.

Brownists, a name given during the latter part of the 16th century to those who were afterward known in England and Holland under the denomination of Independents, called Brownists from Robert Brown (q.v.). See also INDEPENDENTS.

Brownlee, William Craig, American clergyman: b. Torfoot, Lanarkshire, Scotland, 1784; d. New York, 10 Feb. 1860. His paternal ancestors for many generations were the 'Lairds of Torfoot.' He graduated M.A., at the University of Glasgow, was licensed to preach, and came to America in 1808. For a time he taught Latin and Greek in Rutgers College, but in 1826 was installed as one of the ministers of the Collegiate Reformed Dutch Church in New York city. He was a vigorous controversialist, earnestly opposing the Quakers and Roman Catholics. His writings include: 'Inquiry into the Principles of the Quakers' (1824); 'The Roman Catholic Controversy' (1834); 'Treatise on Popery' (1847); 'Lights and Shadows of Christian Life' (1847); 'Deity of Christ'; 'History of the Western Apostolic Church'; and some minor religious tracts and pamphlets.

Brownlow, William Gannaway, American clergyman, journalist, and politician: b. Wythe County, Va., 29 Aug. 1805; d. Knoxville, Tenn., 29 April 1877. Early left an orphan and penniless, he earned enough as a carpenter to give himself a fair education, and in 1826 became an itinerant Methodist preacher. He began his career as a political agitator in 1828 by advocating in Tennessee the re-election of President John Quincy Adams, and in Calhoun's own district in South Carolina he publicly opposed nullification. From 1838 until its suppression by the Confederates in 1861, he published and edited at Knoxville a paper called *The Whig*, his fiery editorials causing him to become known as "the fighting parson." He upheld slavery but opposed secession, a course which subjected him to much persecution. He refused to take the Confederate oath of allegiance, and in consequence was imprisoned on a charge of treason, but finally released and sent into the Union lines, 3 March 1862. On the reconstruction of Tennessee in 1865 he was elected governor and served two terms. He advocated the removal of the negroes to a separate territory and opposed giving them the ballot. In 1869 he was elected to the United States Senate and served until 1875, during which time he was a member of the committees on pensions and revolutionary claims. He wrote: 'The Great Iron Wheel Examined' (1858), a defense of Methodism; 'Sketches of the Rise, Progress, and Decline of Secession: With a Narrative of Personal Adventures Among the Rebels' (1862); and, with Prynne, 'Ought American Slavery to be Perpetuated? A Debate at Philadelphia, September 1858,' in which Brownlow took the affirmative side (1858).

Brownson, Henry Francis, American lawyer and author: b. Canton, Mass., 7 Aug. 1835. He graduated at Holy Cross College, Worcester, Mass., and was admitted to the bar September 1856, after having studied for some years in Paris and Munich. From June 1861 to January 1871 he served in the United States army, chiefly in the artillery, and attained the rank of brevet-major. He wrote various articles for 'Brownson's Quarterly Review' (1853-61), but has chiefly devoted himself to editing the works of his father, Orestes A. Brownson; namely, 'Works of O. A. Brownson' (1883-7); 'Literary, Scientific, and Political Views of O. A. Brownson' (1893). He has also written 'Religion of Ancient Craft Masonry' (1890);

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'Faith and Science' (1895); 'Equality and Democracy' (1897); 'Early, Middle, and Latter Life of O. A. Brownson' (1898-1900); and is the translator of Balmes' 'Fundamental Philosophy' (1856), from the Spanish, and of Tarducci's 'Life of Columbus' (1891), from the Italian.

Brownson, Orestes Augustus, American author and theologian: b. Stockbridge, Vt., 16 Sept. 1803; d. 17 April 1876. He received but little early education, but became an ardent champion of popular rights, and advocated a mild form of socialism. His greatest work was the establishment and editorship of the 'Boston Quarterly Review' (1838-43), afterward known as 'Brownson's Review' (1844-64 and 1873-5). Of his extensive works, the best known are: 'The Convert; or Leaves from My Experience' (1857), and 'The American Republic: Its Constitution, Tendencies, and Destiny' (1870). See his 'Works,' republished by his son, H. F. Brownson (1882-7); also his 'Life,' by the same (1898-1900).

Brownstone, the reddish-brown sandstone of the Triassic Age, so named originally in the Eastern United States, where it occurs in New Jersey and Connecticut. The name is now generally used for any brown sandstone adapted for building purposes, but the most important stones included under this name are those just mentioned, which are quarried at Portland and Middletown, Conn., and the Cambrian or Pre-Cambrian sandstones that are worked near Marquette, Mich. The use of brownstone has greatly diminished in recent years, granite and limestone having largely superseded it in public favor.

Brownsville, Texas, a city, port of entry, and county-seat of Cameron County, situated on the Rio Grande River, and the Rio G. R.R., opposite Matamoros, Mexico. It contains the cathedral of the Immaculate Conception, the Convent and Academy of the Incarnate Word, a United States government building, and a national bank, and has a large trade with Mexico. In the suburbs is Fort Brown, a garrisoned United States post. In May 1846 Brownsville was occupied and fortified by a small body of United States troops, who maintained their position in the face of a heavy bombardment that lasted for 160 hours, and in November 1863 it was taken from the Confederates by a Federal army under Gen. Banks. Pop. (1900) 6,305.

Brownwood, Texas, a city and county-seat of Brown County, situated on the Gulf. C. & S. F., and the Fort Worth & R. G. R.R.'s, 140 miles northwest from Austin. It was settled in 1866 and incorporated in 1878. It trades in wheat, hay, cotton, cattle, hides, and pecan nuts. There are flour mills, cottonseed-oil mills, and manufactories of wire-fencing, saddle and harness, ice, etc. Here are located the Daniel Baker College, under Presbyterian auspices, and the Howard Payne College, controlled by the Baptists. The city owns its waterworks. Pop. (1900) 3,965.

Brož'ik, Vaczlav, Bohemian artist: b. near Pilsen, 1852; d. 1901. He was a pupil at the Prague Academy, and also of Piloty. Most of his subjects were taken from the history of Bohemia, and as a historical painter he won high rank. Among his works may be mentioned the

'Embassy of Ladislav of Bohemia to Charles VII. of France'; 'The Execution on the White Mountain'; 'The Ballad Singer'; and 'The Imperial Councilors Thrown Out of the Window at Prague.' His 'Columbus at the Court of Ferdinand and Isabella' is in the Metropolitan Museum, New York.

Bru, broo, Moses Vincent, Spanish painter: b. Valencia, 1682; d. 1703. He studied under Juan Conchillos, an able master, and soon outstripped all his fellow-students. When very young he was employed to execute three paintings for a church of his native town. They are highly praised by Palomino Velasco. The great hopes of future excellence which they raised were disappointed by his premature death at the age of 21.

Bruce, a noble family of Scotland, two members of which occupied the throne after one had pretended to it in vain. Distinguished members were:

1. **ROBERT**, seventh lord of Annandale: b. 1210; d. 1 April 1295. He was one of the 13 claimants of the crown in 1290, when, by the demise of Margaret, the "maiden of Norway," the posterity of the last three kings of Scotland had become extinct, and the succession reverted to the posterity of David, Earl of Huntingdon, and younger brother of King William, the Lion. The question of succession speedily resolved itself into a simple alternative between two competitors, John Baliol, the great-grandson of David by his eldest daughter, Margaret, and Robert Bruce, the grandson of David by his second daughter, Isabel. The contest was, by mutual consent, referred for decision to King Edward I. of England, who pronounced, in accordance with principles that would not now be disputed, that "in all indivisible heritages the more remote in degree of the first line of descent is preferable to the nearer in degree of the second," and thus gave the kingdom to Baliol, from whom he required homage and fealty. Bruce now retired to England, took service in the English army, and fought against Baliol in the war which resulted in the subjugation of Scotland to England. He returned to his English estates soon after the resignation of Baliol, passed the last years of his life in the deepest contempt among the more patriotic of his countrymen, and died about 1296.

2. **ROBERT**, son of the preceding, Earl of Carrick and Annandale: d. 1304. He constantly followed the fortunes of Edward, and fought bravely against Wallace and the patriot party of Scotland. After having assisted in defeating Wallace at Falkirk, he is said to have slackened his zeal for England, but did so little for the national cause that he was able to make his peace with Edward when, a little later, after the capitulation at Irvine, Wallace was driven with his adherents into the northern mountains.

3. **ROBERT**, son of the preceding, Earl of Carrick, and afterward king of Scotland: b. 21 March 1274; d. 9 July 1329. He acted at first as Edward's liegeman, but vacillated between the two parties, taking no very active part in the struggle between Wallace and England, but inclining to the national cause when a gleam of success enlivened the hopes of the patriots, and, at the approach of Edward, making his peace with the conqueror. He was one of those consulted by the king in the settlement of Scotland

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as an English province, and was permitted to retain the extensive lands of his ancestors unalienated. In 1306, Comyn, the son of Baliol's sister, a nobleman distinguished by his efforts to recover the independence of his country, arrived in Dumfries about the same time with Bruce. By appointment he met Bruce alone in the church of the Minorites, who there stabbed him with his dagger; whether by premeditated treachery or in a sudden fit of passion cannot now be ascertained. Bruce now assumed the title of king, summoned the Scots to his standard, and was crowned, without any opposition, at Scone. Edward immediately sent Aymar de Valence, Earl of Pembroke, with a great army to chastise the rebels. The force of Bruce was almost immediately destroyed, six of his best knights made prisoners, and he himself, thrown from his horse, was rescued only by the devotion of Seaton. For two months, with his brothers and the ladies of his household, he wandered to and fro in the Grampian Hills, till, his party being discovered, defeated, and forced to separate, he buried himself for concealment in the island of Rathlin, on the north of Ireland. His three brothers, and others, were captured; and the brothers were soon after hanged at Carlisle. In the spring of 1307 Bruce returned from his retreat, surprised his own castle of Carrick, defeated small parties of English in many skirmishes, and was enabled to maintain himself among the hills and forests until Edward called out an army and marched toward the borders, but died on his way, leaving to his son a charge not to bury his bones till he had borne them in triumph from Berwick bounds to the utmost highlands. For three years Edward II. paid no attention to his father's advice or the Scottish war, but in the autumn of 1310 he marched into Scotland as far as the Forth without encountering an enemy, for Bruce wisely declined to give him battle. In the next year he sent his favorite Gaveston to renew the war, who penetrated beyond the Forth, but still gained no advantage, Bruce constantly retreating before him, keeping the hills, where he could not be assailed, and harassing the English by constant petty skirmishes in which he mostly worsted them. The following years were passed by Edward in ignoble contentions with his Parliament, and by Bruce in gradually but surely recovering all that he had lost in Scotland, until, in 1314, the strong hill fortress of Stirling alone held out for the English, and even that the governor, Mowbray, had been forced to consent to surrender if it should not be relieved before the feast of St. John the Baptist. This at length aroused Edward, who, at the head of a large army, encamped in the neighborhood of the beleaguered fortress, and was there met by Bruce at the head of 30,000 picked men, on the eve of the festival fixed for its surrender. The battle of Bannockburn, which succeeded, was the bloodiest defeat which the English ever suffered at the hands of their Scottish neighbors. It fixed the crown securely on the head of Bruce, and at once enabled him to exchange his prisoners, who were of the highest rank in England, against his wife, his sister, and his other relatives, who had long languished in captivity. After this success the Scottish people assumed the offensive and invaded Ireland, where they at first gained considerable successes, and of which island Edward Bruce was crowned king. While the dissen-

sions lasted between Edward II. and his barons, Robert Bruce repeatedly devastated the borders and all the north of Yorkshire, even to the walls of York, into which he on one occasion chased the English king in disgrace, narrowly failing to make him prisoner. In 1323 this bloody war, which had raged, with few pauses, for 23 years, was brought to a close by a truce concluded between the two kingdoms for 13 years, to remain in force even in the event of the death of one or both of the contracting parties. Four years after this Edward II. was compelled to abdicate in favor of his son, Edward III., and Bruce, seeing his occasion in the distracted state of England, renewed the war, with the avowed intention of forcing Edward to renounce his claim of sovereignty over the crown of Scotland. In 1328 this renunciation was made; Scotland was declared sovereign and independent; Jane of England, the sister of Edward, was affianced to David, prince of Scotland; and Robert Bruce paid £20,000 sterling to defray the expenses of the war. He died the next year, having, after a life of incessant toil and warfare, secured the independence of his country and won the crown, which he left undisputed to his son.

4. **EDWARD:** d. 1318. He was a brother of Robert I., of Scotland, who, after distinguishing himself in the Scottish war of independence, crossed in 1315 to Ireland to aid the native septs against the English. After many successes he was crowned king of Ireland at Carrickfergus, but fell in battle near Dundalk.

5. **DAVID,** son of the preceding, king of Scotland: b. about 1320; d. 22 Feb. 1371. Shortly after his accession, at the age of nine years, his kingdom was invaded, and his crown wrested from him by Edward Baliol, son of that John Baliol whom Edward I. had compelled to resign the crown. In support of his claim Edward III. maintained a fierce strife on the borders, in active though undeclared hostilities to the Scots. David, with his young queen, Jane of England, escaped to France, where he resided till 1341, when, the nobles Murray, Douglas, and Stuart having expelled Baliol from the throne into the northern counties of England, he ventured to return. In 1346, while Edward III., with the flower of his army, was absent in France, David suddenly invaded England at the head of 33,000 men. He was met at Neville's Cross, Durham, by a force of 11,200 irregular troops under Queen Philippa. The Scottish troops were totally defeated, leaving 15,000 men dead on the field of battle and their king a prisoner. From this time until 1357 David was detained a prisoner in the Tower of London, when he was liberated after the battle of Poitiers, on agreeing to pay 100,000 marks in 20 half-yearly instalments.

Bruce, Blanche Kelso, American colored politician: b. Prince Edward County, Va., 1841; d. 1898. Born in slavery but educated with the son of his master, and subsequently a student at Oberlin College, he became a planter in Mississippi in 1869. Entering politics he became a United States senator from Mississippi in 1875, the first negro member of the National Senate. He was appointed register of the United States Treasury in 1881, holding office till 1885, and was reappointed to the same office by President McKinley in 1897.

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Bruce, Catherine Wolfe, American patron of science: b. New York; d. there, 13 March 1900. She was a cousin of Catherine Lorillard Wolfe, from whom she inherited a fortune, which she used in furthering astronomical study at Harvard. She gave \$50,000 to the Harvard Observatory in 1888. The Bruce Memorial Telescope at Arequipa, Peru, was her gift. In 1897 she established a gold medal fund for the Astronomical Society of the Pacific.

Bruce, David, English surgeon and scientist: b. Melbourne, Australia, 29 May 1855. He entered the Royal Army Medical Corps in 1883, was assistant professor of pathology in the army medical school at Netby, England, 1889-94, and served in South Africa, 1894-1901. He was promoted to be lieutenant-colonel in 1900. He is an authority on Malta fever, and has published various articles upon that subject in medical journals and dictionaries.

Bruce, Sir George Barclay, English engineer: b. Newcastle-on-Tyne, 1 Oct. 1821. He was trained as a civil engineer under Robert Stephenson, and in 1850 completed the Royal Border bridge at Berwick, which Stephenson had begun. He became chief engineer of the Madras Railway in 1853 and has been engineer of various other important lines of railway in Europe, New Zealand, South America. He was president of the Institute of Civil Engineers, 1887-8.

Bruce, James, Scottish traveler: b. Kin-naird House, Stirlingshire, 14 Dec. 1730; d. there, 27 April 1794. He became a wine merchant in 1754, but on the death of his wife he took up the study of languages, and availed himself of the opportunities of his trade to visit Spain, Portugal, and the Netherlands. In 1758 he inherited his father's estate, and he consequently relinquished the wine trade in 1761. Lord Halifax, appreciating Bruce's character, proposed to him a tour of discovery, in which he promised him his protection and support. He pointed specially to the exploration of the coast of Barbary, in completion of the labors of Shaw, and hinted also at the discovery of the sources of the Nile. In the meantime Halifax offered him the consulship of Algiers, which was accepted. His consulship lasted for two years, and on its expiration in 1765 he visited successively Tunis, Tripoli, Rhodes, Cyprus, Syria, and several parts of Asia Minor, where, accompanied by an able Italian draughtsman, he made drawings of the ruins of Palmyra, Baalbec, and other remains of antiquity. Having now formed his plan for visiting Abyssinia, he set out for Cairo in June 1768, after about a year spent in Syria, navigated the Nile to Syene, crossed the desert to the Red Sea, passed some months in Arabia Felix, and reached Gondar, the capital of Abyssinia, in February 1770. On 14 Nov. 1770, he succeeded in reaching the sources of the Abai, then considered the main stream of the Nile. His 'Travels to Discover the Source of the Nile' appeared in 1790, in five large quarto volumes. The authority of the work, in regard to facts of natural history and human manners, was questioned on its first appearance; but the truth of his descriptions, however, has been amply confirmed by travelers who have visited the same regions. This enterprising traveler lost his life in consequence of an accidental fall down stairs.

Bruce, Michael, Scottish poet: b. Kinness-wood, Kinross-shire, Scotland, 1746; d. 1767. His struggle with poverty, together with constitutional disease, gave a melancholy turn to his mind, and influenced the character of his writings. For a short time he was engaged in the occupation of a village schoolmaster, the fatigues of which probably shortened his life. His poems, which are few in number, but remarkably pathetic, were published by the Rev. John Logan, together with some of his own, at Edinburgh, in 1770. One, composed in anticipation of his own death, is peculiarly affecting.

Bruce, Thomas, Earl of Elgin and Kincardine, English diplomatist and antiquary: b. 27 July 1766; d. Paris, 14 Nov. 1841. He was successively envoy at Brussels, Berlin, and Constantinople, and made a valuable collection of ancient sculptures at Athens, which was purchased by Parliament for the British Museum in 1816, and is known as the Elgin Marbles. See ELGIN MARBLES.

Bruce, Wallace, American poet: b. Hillsdale, N. Y., 10 Nov. 1844. He graduated at Yale College in 1867; and was United States consul at Edinburgh, Scotland, 1889-93. He became a lecturer on literary topics, and has published 'Wayside Poems'; 'Old Homestead Poems'; 'The Hudson'; 'The Yosemite'; 'Parson Allen's Ride'; 'The Land of Burns.'

Bruce-Joy, Albert, Irish sculptor: b. Dublin, 21 Aug. 1842. He was a pupil of John Foley, and studied several years in Rome. His first exhibit was in the Royal Academy in 1866. Among his many works are the Harvey tercentenary statue; a colossal statue of John Bright at Manchester; Matthew Arnold, and Adams the astronomer in Westminster Abbey; and in the United States a portrait bust of Chauncey Depew at the Lotus Club, New York; and the Ayer lion at Lowell, Mass.

Bru'cea, a genus of shrubs of the natural order *Simarubaceae*, natives of warm climates, the leaves of certain species of which have been used in medicine. The bark was supposed, during the early years of the 19th century, to be an adulterant of Angostura bark. The use of the various species is almost wholly confined to their native countries.

Bruch, brooh, Max, German composer: b. Cologne, 6 Jan. 1838. He studied at Bonn under Breidenstein, and at Cologne as a special pupil of Hiller, in 1853-7. During this period he completed several of his musical compositions. In 1865 he was director of the musical institute in Coblenz; and from 1870 to 1880 lived in Berlin and Bonn. In 1880 he went to Liverpool to become director of the Philharmonic Society; in 1883 he came to the United States and conducted his own oratorio 'Arminius' in Boston; in 1887 he was made a member of the Berlin Academy; and in 1890 obtained the title of royal professor. Bruch ranks among the foremost of the modern composers. His best works include: 'The Flight of the Holy Family'; 'Ulysses'; 'Arminius'; 'Lied von der Glocke' (words by Schiller); 'Achilles'; 'Scenes from the Frithjof's Saga'; 'Roman Triumph Song'; 'Salamis'; two operas, 'Lorelei' and 'Hermione'; and two violin concertos.

Bruchési, broo-kā'zē, Napoléon Paul, Canadian Roman Catholic prelate: b. Montreal,

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20 Oct. 1855. He pursued his theological studies at Paris and Rome, being ordained priest in 1878. In 1887 he was made a canon at the cathedral in Montreal. He was successively vicar at St. Bridget's and St. Joseph's churches in Montreal, and in 1897 was appointed archbishop of Montreal to succeed the late Monsignor Fabre.

Bruchsal, broo'h'säl, a town of Baden, on both sides of the Salzbach, 12 miles from Karlsruhe, now an important railway centre. It is an ancient town, was a common residence of the prince-bishops of Spire from the 12th century, and the residence formerly occupied by them is still standing. This is a building in the rococo style, erected in 1720-70, and in connection with it is a fine garden with fountains. In the Church of St. Peter the prince-bishops were buried. Soap, paper, cigars, etc., are made. Pop. (1900) 13,567.

Bru'chus, a genus of beetles belonging to the section tetramera, and the family *Rhynchophora* or *Curculionidæ*. The antennæ are 14-jointed, and are filiform, serrate, or pectinated, not geniculated as in the more normal *Curculionidæ*. It contains small beetles which deposit their larvæ in the germs of leguminous plants, and, when hatched, devour their seed. *B. pisi* is destructive to the garden pea.

Brucine, broo'sin (from Brucea), an alkaloid discovered in 1819, and obtained in the preparation of strychnine, from which it is separated by boiling alcohol. It crystallizes in white and transparent prisms, with a rhomboidal base. It has a very bitter taste, but no smell, and is less poisonous than strychnine. It is insoluble in ether, and dissolves in a mixture of 850 parts of cold and 500 parts of boiling water. Nitric acid gives it a scarlet, and sulphuric acid a rosy tint, but both turn gradually to yellow. A solution of copper turns it to violet. These reactions distinguish brucine both from strychnine and morphine. The salts of brucine are tolerably numerous, and are prepared by double decomposition, or by direct combination of the brucine with the acid. They are for the most part crystallizable, and like the base have a bitter taste. They are not used in medicine. Symbol $C_{24}H_{26}N_2O_4 + 4H_2O$.

Brucioli, or Bruccioli, Antonio, än-tō'nē-ō broo-chē-ō'lē, Italian reformer and scholar: b. Florence, about 1500; d. after 1554. In 1522, having become implicated in a conspiracy against Giulio di Medici, who then governed Florence in the name of Leo X., he took refuge in France, where he became acquainted with the doctrines of the reformers, and probably embraced them. On the expulsion of the Medici in 1527 he returned to Florence, but, by his free declamation against monks and clergy, brought his orthodoxy in question, and was imprisoned on several charges, among which that of heresy was included. He would have been executed but for the interference of powerful friends, who obtained a commutation of his sentence into banishment. He retired to Venice with two brothers, who were printers, and availed himself of their press to publish a great number of works, of which the most celebrated is a translation of the Bible into Tuscan. The boldness of his annotations caused it to be ranked as a heretical work. Brucioli was living in 1554, but the exact date of his death is not known. The

number of his volumes is said to have exceeded that of his years. Among his works are Italian translations of Pliny, Aristotle, and Cicero, and annotated editions of Petrarca and Boccaccio.

Bru'cite, a native hydrate of magnesia, having the formula $Mg(OH)_2$. It occurs in massive forms with a foliated or fibrous structure, and also in broad, tabular, rhombohedral crystals. It is nearly white, and translucent with a pearly or waxy lustre. It has a hardness of 2.5, and a specific gravity of about 2.4. It dissolves completely in acids. In the United States it occurs in New Jersey, New York, and Pennsylvania. Brucite was named for Dr. A. Bruce, an American mineralogist who first described it as a species.

Bruck, Karl Ludwig, kärl lood'-vīg brook (BARON), Austrian statesman: b. Elberfeld, 8 Oct. 1798; d. Vienna, 23 April, 1860. In 1821 he went to Trieste in order to take part in the war for Grecian independence, and remaining there several years, founded the Trieste Lloyd (later the Austrian Lloyd), a combination of insurance societies. In 1848 he was a member of the German National Assembly; after the Vienna revolution of October 1848 he became minister of commerce and public works. In this office he introduced a number of reforms in the industrial policy of the government, established important telegraph lines, built a number of highways and railroads, and founded the Austro-German postal union. In 1849 the emperor gave him the rank of baron, but in 1851 he was compelled to resign his ministry. In 1855 he became minister of finance; he was not able to introduce the reforms he wished, and when a period of general financial disaster resulted from the Italian war, Bruck was personally blamed. He accordingly obtained his dismissal from the emperor and the next day committed suicide. He was officially declared innocent one month after his death.

Brucker, Johann Jakob, yō'hän yā-kōb brook'er, German historian: b. Augsburg, Bavaria, 22 Jan. 1696; d. there, 26 Nov. 1770. He was educated at Jena, and in 1744 became pastor at Augsburg. His most important work is a 'Critical History of Philosophy' (1741-4), in Latin, which was the first complete history of the different philosophical schools. In contains biographical matter of great value.

Bruckner, Anton, än'tōn brook'nēr, Austrian organist and composer: b. Ansfelden, 4 Sept. 1824; d. 11 Oct. 1896. He was mostly self-educated, but after serving as organist in the cathedral at Linz he studied for a time in Vienna under Simon Sechter, whom he succeeded as court organist. He later became professor at the Vienna conservatory and lecturer on music at the University. Bruckner is to some extent an imitator of Wagner; his best known compositions are his symphonies; he has written also some religious music, including a Te Deum and several masses.

Brueis, or Bruys d'Aigalliers, François Paul, French admiral: b. Uzès, 11 Feb. 1753; d. 1 Aug. 1798. He entered the navy at an early age, and gradually rose in the service. In 1798 he was employed to convey Bonaparte and his army, which were to effect the conquest of Egypt and the East, and having managed to elude the vigilance of Nelson, who had been

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long watching for him, reached the Bay of Abukir, and disembarked the troops in safety. Bruce moored his fleet in a position naturally so strong that he deemed it impregnable; but by the heroic daring of Nelson, he found the precautions which he had taken turned to his disadvantage. In the battle which ensued, he fell fighting boldly, a little before his ship, the *Orient*, of 100 guns, blew up. See **ABUKIR**.

Bruges (Flemish, *Brugge*), a city of Belgium, capital of West Flanders, situated about 60 miles northwest of Brussels, about 8 miles from the sea, surrounded and intersected by canals which connect it with Ostend and other places. By these canals fairly large vessels can reach Bruges; and a ship canal to connect it with the sea at Zeebrugge, a port on the North Sea, $7\frac{1}{2}$ miles distant, was begun 25 Feb. 1900. This will allow ships of 25 feet draft to reach the wharves of the city. Bruges has over 50 bridges, all opening in the middle for the passage of vessels. The Halles (containing cloth and other markets) is a fine old building, with a famous belfry or tower 350 feet high, in which is a fine carillon of 48 bells. Bruges has also a beautiful town hall dating from the 14th century; a palace of justice, noted for a magnificently adorned fireplace; an academy of painting, sculpture, and architecture; a public library, etc., and many valuable specimens of architecture and sculpture. In the Church of Notre Dame, which has a spire 290 feet high, are the splendid tombs of Charles the Bold and of Mary of Burgundy, his daughter, constructed in 1550, besides many other artistic treasures. The cathedral of Saint Sauveur dates from the 13th and 14th centuries, and is unattractive externally, but has a fine interior, and there are other notable churches. Philip the Good here founded the order of the Golden Fleece in 1430; and the celebrated Jan Van Eyck, or John of Bruges, the supposed inventor of painting in oil, was born here. From the 7th century Bruges was rapidly acquiring importance. It was fortified by Count Baldwin in 837, walled first in 1053, and again in 1270. During the government of the rich and powerful counts of Flanders, who resided there from the 9th to the 15th centuries, its woolen manufactures grew and flourished to an amazing extent. The wealth of the citizens was enormous; a single merchant gave security for the ransom of Jean sans Peur, the last count of Flanders, to the amount of 400,000 crowns of gold. Under the Austrian dynasty, at the close of the 15th century, the rebellious conduct of the inhabitants of Bruges called upon it such destructive vengeance that henceforth its greatness died away, its trade was transferred to Antwerp, and the religious persecution and ferocity of the Spanish under Philip II. and the Duke of Alva completed the process of its ruin. The remains of ancient buildings, abandoned monasteries, and streets half deserted from the diminished population of the modern city, give Bruges an antiquated and venerable appearance. Many of the houses are very old, but in a state of excellent preservation. Bruges is still, by means of its canals, an entrepôt of Belgian commerce. The chief articles manufactured here are lace, linen, damasks, light woolen goods, cottons, mixed stuffs, beer, etc. It exports agricultural produce and manufactured goods, and imports wine, oil,

colonial produce, etc. Pop. (1900) 52,867. See Gilliat-Smith, 'Bruges' in 'Mediæval Towns Series' (1901).

Brugg, a town in the Swiss canton of Aargau, on the right bank of the Aar, and near the mouth of the Reuss, 36 miles east-southeast of Basel by rail. Near it is the site of Vindonissa, the chief Roman station in Helvetia; and it was also the cradle of the house of Hapsburg, whose ruined castle, founded in 1020, crowns a wooded height two miles distant. Nearer is the abbey of Königsfelden (1310; converted in 1872 into an asylum), in the vaults beneath which are interred many of the members of the Austrian royal family. Zimmermann, the philosopher, was born here in 1728. Pop. (1900) 2,629.

Brugmann, Friedrich Karl, frēd'-rīn karl broog-man, German philologist: b. Wiesbaden, 16 March 1849. He was educated at Halle and Leipsic; was instructor in the gymnasium at Wiesbaden and at Leipsic; and in 1872-7 was assistant at the Russian institute of classical philology at the latter place. In 1877 he was lecturer at the University of Leipsic, and in 1882 became professor of comparative philology there; in 1884 he took the same position at the University of Freiburg, but returned to Leipsic in 1887 as successor to Curtius. He is one of the chief representatives of the new school of philologists and his researches have done much to revolutionize the study of philology. As joint editor with Curtius of 'The Studies in Greek and Latin Grammar,' he wrote an article for this work on 'Nasils Sonans,' in which he defended theories so radical that Curtius afterward disclaimed them. His conclusions are now generally accepted. His most important work, summarizing his conclusions, is 'Outline of the Comparative Grammar of the Indo-Germanic Languages' (translated into English); he also wrote 'Morphological Researches in the Indo-Germanic Languages' (with Osthoff); 'A Problem of Homeric Textual Criticism' (1870); 'Lithuanian Folk Songs and Tales' (1882); 'The Present Position of Philology'; 'Greek Grammar'; and 'Short Comparative Grammar' (1902). Brugmann was knighted by the king of Saxony, and in 1896 received the degree of LL.D. from Princeton University.

Brugsch, Heinrich Karl, German Egyptologist; b. Berlin, 18 Feb. 1827; d. Charlottenburg, 9 Sept. 1894. A work entitled 'Scriptura Ægyptiorum Demotica,' published in 1848, gained him the favor of Alexander von Humboldt and Frederick William IV., the latter of whom enabled him to complete his studies by visiting the museums of Paris, London, Turin, and Leyden. In 1853 he made his first visit to Egypt and assisted Mariette in his researches, being appointed on his return in the following year assistant in the Berlin Egyptian Museum. He accompanied the Prussian embassy to Persia in 1860, and four years later became consul at Cairo. Returning in 1868, he was appointed to the chair of Egyptology at Göttingen, but soon resigned in order to take charge of the Cairo School of Egyptology. He was soon raised to the rank of bey, and some time afterward to that of pasha. In 1876 he came to the United States as Egyptian commissioner to the Centennial Exposition at Philadelphia. In 1883

he traveled in Egypt, Syria, Greece, and Italy, with Prince Frederick Charles of Prussia, and in 1885-6 he twice visited Persia, partly on official business. He was again in Egypt in 1891, and in the following year he made a journey to the Libyan desert. Brugsch's chief work is the *Hieroglyphisch-demotisches Wörterbuch* (1867-82). His other writings include 'Reiseberichte aus Ägypten' (1855); 'Grammaire Démotique' (1855); 'Monuments de l'Égypte' (1857); 'Geographische Inschriften altägyptischer Denkmäler' (1857-60); 'Histoire d'Égypte' (1859); 'Recueil des Monuments Égyptiens' (1862-85); 'Reise der königlich Preussischer Gesandtschaft nach Persien' (1862-3); 'Hieroglyphische Grammatik' (1872); 'Geschichte Ägyptens unter den Pharaonen' (1877); *Dictionnaire Géographique de l'ancienne Égypte* (1877-80); 'Religion und Mythologie der alten Ägypter, nach den Denkmälern' (1888); 'Thesaurus Inscriptionum Ægyptiacarum' (1883-91); 'Die Ägyptologie' (1890); 'Aus dem Morgenlande, Altes und Neues' (1893); etc. His 'History of Egypt from the Monuments' has appeared in English. In 1894 his autobiography appeared under the title 'Mein Leben und Wandern.'

Brühl, Heinrich (COUNT VON), Saxon politician: b. Weissenfels, Prussia, 13 Aug. 1700; d. Dresden, 28 Oct. 1763. As a page he gained the favor of Frederick Augustus I. of Poland, and on the death of the king in 1733, the crown of Poland with the other regalia being, through the good fortune of Brühl, intrusted to him, he carried them immediately to the new elector, Augustus III., and showed the greatest activity in promoting his election. He had cunning and skill sufficient to govern his master and get rid of his rivals and succeeded in keeping everybody at a distance from the king. No servant entered his service without the consent of Brühl, and even when he went to the chapel all approach to him was prevented. Brühl kept 200 domestics; his guards were better paid than those of the king himself, and his table more sumptuous. Frederick II. says of him, "Brühl had more garments, watches, laces, boots, shoes, and slippers, than any man of the age. Caesar would have counted him among those curled and perfumed heads which he did not fear"; but Augustus III. was no Caesar. When this idle prince loitered about smoking, and asked, without looking at his favorite, "Brühl, have I any money?" "Yes, sire," was the continual answer; and to satisfy the king's demands he exhausted the state, plunged the country into debts, and greatly reduced the army. At the beginning of the Seven Years' War it comprised but 17,000 men, and these were compelled to surrender at Pirna from want of the necessary supplies. Brühl fled with the king, the pictures, and the china, to Poland; but the archives of the state were left to the victor. He was no less avaricious of titles and money than of power. An examination after his death showed that he owed his immense fortune to the prodigality of the king rather than to unlawful means of accumulation. His own profusion was often beneficial to the arts and sciences.

Bruhns, bröns, Karl Christian, German astronomer: b. Plön, Holstein, 22 Nov. 1830; d. Leipzig, 25 July 1881. He was the son of a locksmith, going in 1851 as locksmith and mechanic to Borsig, and then to Berlin with Sie-

mens and Halske, he attracted the attention of Encke by his remarkable powers as a computer, and was appointed in 1852 as assistant, and in 1854 as observer, in the Berlin Observatory, and in 1859 as instructor in the university. In 1860 he was called to Leipsic as professor of astronomy and director of the new observatory to be constructed there, which, under his skilful direction, grew into one of the finest structures of its kind in Europe. He is known as the discoverer of five comets, an able computer of cometary and planetary orbits, and for his important work in geodesy in connection with the European triangulation.

Bruise, or Contusion, an injury caused by a blow or sudden pressure, in which the skin is not wounded, and no bone broken or dislocated. Both terms, but more particularly the latter, are employed in surgery to include all such injuries from a black eye to a thoroughly crushed mass of muscle. In the slighter forms of this injury, as in ordinary simple bruises, there is no tearing, but only a concussion of the textures, the utmost damage done being the rupture of a few small blood vessels, occasioning the discoloration always observed in these cases. In more severe contusions, the subjacent structures—muscles, connective tissue, vessels, etc.—are more or less ruptured, and in extreme cases are thoroughly crushed and usually become gangrenous. The quantity of blood extravasated depends chiefly upon the size and number of the ruptured blood vessels, but partly also on the nature of the textures of the injured part. Thus, a lax tissue, as that of the eyelids, favors the escape of blood into the surrounding parts. Simple and not very severe bruises require little treatment other than the rest necessary for the avoidance of pain; but the removal of the swelling and discoloration may be hastened by the application of various local stimulants, which seem to act by accelerating the circulation through the bruised part, and promoting the absorption of the effused fluid. Friar's balsam, compound soap liniment, or poultices made with the roots of black bryony beaten to a pulp, are popular remedies of this class. Tincture of arnica has a great reputation; but experiments have made it very doubtful whether it is any more efficacious than simple spirit of the same strength. A solution of sulphurous acid, and hazeline and other preparations of the American witch-hazel are of more value. They should be kept constantly applied to the bruised part on lint or cotton wool. Pugilists, who are probably better acquainted with ordinary bruises than any other class of men, are in the habit of removing the swelling of the eyelids that often naturally occurs during a prize fight to such an extent as to close the eyes, by at once puncturing the eyelids at several points with a lancet; and their favorite remedy for a black eye or other bruise on the face is a fresh beefsteak applied locally as a poultice. Bruises of a more severe nature, as when there is much breaking or crushing of the tissues, must, of course, at once be referred to the care of a surgeon.

Brüll, Ignaz, Austrian pianist and composer: b. Prossnitz, 7 Nov. 1846. He was educated at Vienna under Epstein and Dessoff and played at concerts there and in London. His first composition appeared in 1861 and since then

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he has been instructor at a school of music in Vienna and has won distinction as a composer. His works include several numbers for the piano; orchestral pieces and operas, among them, 'The Beggar of Samarkand'; 'The Golden Cross'; 'Bianca'; 'Queen Marietta'; 'The Heart of Stone'; and 'The Hussar.'

Brumaire, brü-mär', the second month of the year in the French revolutionary calendar. It commenced on 23 October and ended on 21 November, thus comprising 30 days. It received its name from the fogs that usually prevail about this time. The 18th of Brumaire, VIII. year (9 Nov. 1799), is celebrated for the overthrow of the directory and the establishment of the sway of Napoleon. See CALENDAR.

Brumidi, broo-mé'dē, **Constantine**, Italian painter: b. Rome, 20 June 1805; d. Washington, D. C., 29 Feb. 1880. After study in his native city he was given many important commissions, and some of his best works are found in the Vatican and the more modern Roman palaces. The occupation of Rome by the French caused him to emigrate to America, and in 1852 he became a citizen of the United States. After settling in this country he executed much of the decoration of the national capitol, and began work on a series of historical paintings, forming a belt about the base of interior of the dome, the first frescoes in America.

Brummagen, Joe. See CHAMBERLAIN JOSEPH.

Brummel, **George Bryan** ("BEAU BRUMMEL"), English dandy: b. London, 1778; d. Caen, 29 March 1840. He was educated at Eton and Oxford, at both of which places he acquired great distinction by his taste in dress, which afterward made him the autocrat in the world of fashion. At the age of 16 he casually made the acquaintance of the Prince of Wales, afterward George IV., who conceived a wonderful fancy for him and made him a cornet in his own regiment, the 10th Hussars. Brummel was now introduced into the most aristocratic society in England, and through the favor of the prince had rapid promotion in the army, though his carelessness was such that he often did not know his own troop. The death of his father in 1794 put him in possession of a fortune of £30,000, which he expended in a course of sumptuous living, extending over a period of 21 years, during which his dicta on matters of etiquette and dress were received in the *beau monde* as indisputable. He kept a magnificent bachelor establishment, gave splendid dinners, and basked in all the sunshine that youth, money, and princely favor could bestow. But the fickle temper of the prince regent at last tired of Brummel, and an estrangement took place. The beau's creditors now began to be clamorous, and in 1814 he crossed the channel to Calais, where he resided for many years, partly supported by the remains of his own fortune and partly by remittances from friends in England. In 1824, when George IV. passed through Calais on his way to Hanover, Brummel ventured again to address himself to him, but was unceremoniously repulsed. Subsequently to this he was appointed consul at Caen, but after holding this office for a few years it was abolished as unnecessary, and he was reduced to absolute poverty. His mind, too, gave way, and he died in a lunatic asylum.

Brun, or **Brunn**, **Malte-Conrad** (generally known as MALTE-BRUN), Danish geographer: b. Thisted, Jutland, 12 Aug. 1775; d. 14 Dec. 1826. While yet very young he produced some poems which gave great promise of his rising to eminence as a poet, though his father had destined him for the Church. About this time the French Revolution called forth a host of ardent champions of the cause of progress throughout Europe, and the young poet embraced it with enthusiasm. He abandoned the Church for the bar, and subsequently became editor successively of two journals, in which his advocacy of liberal principles provoked a state prosecution that compelled him to take refuge in the Swedish island of Hven, once the residence of Tycho Brahe. From this he shortly afterward received permission to return to Copenhagen; but some fresh attacks on the government again made him an exile, and he retired first to Sweden and then to Hamburg, where a wealthy merchant entrusted him with the education of his children. Not long after, his admiration of Napoleon Bonaparte, then rapidly advancing to the head of affairs, prompted him to take up his abode in France; but the elevation of his idol to the post of consul for life opened Brun's eyes to his ambitious designs. He had the courage openly to blame the weakness of the senate in yielding to them, and for the time withdrew from the pursuit of politics. He now directed his attention to the science of geography. In 1803 he published, along with Mentelle and Herbin, the commencement of 'Géographie Mathématique, Physique, et Politique de toutes les Parties du Monde,' a work which was completed in 16 volumes in 1807, and in the composition of which Brun's share amounted to about a third. Before the completion of this work his reputation as a writer had been firmly established, and in 1806 he received an appointment on the staff of the *Journal des Débats*, for which he continued to write articles on foreign politics until his death. In 1808 appeared his 'Tableau de la Pologne,' and the same year he joined M. Eyriès in starting the 'Annales des Voyages, de la Géographie, et de l'Histoire,' which proved the introduction into France of regular periodical geographical literature. In 1810 was published the first volume of his 'Précis de la Géographie Universelle,' completed in eight volumes in 1820, and reissued in 12 volumes in 1831. During the Hundred Days Brun adhered to the legitimist cause, and published an 'Apologie de Louis XVIII.' Toward the end of 1821 he lent powerful assistance in establishing the Société de Géographie. Besides the works already mentioned, he was the author of various geographical and political treatises too numerous to particularize.

Brunai, broo-nā'ē, **Brunei**, broo-nā'ē, or **Bruni**, broo'nē, Borneo, a territory on the northwest part of the island, situated between Sarawak and British North Borneo, under the protection of Great Britain. It has an area of about 18,000 square miles. It exports sago, gutta-percha, rubber, etc. Until 1888 it was nominally an independent Mohammedan territory, whose sultan was formerly overlord of the whole island. Its population is variously estimated at from 50,000 to 125,000, divided into trade castes. The capital, Brunai, on a river

BRUNANBURGH — BRUNE

of the same name, about 14 miles from its mouth, is a miserable, dirty town, built on piles, with some 30,000 inhabitants, who trade with Singapore.

Brunanburgh, broo-nān-bur'ō, Scotland, the scene of a battle in which Athelstan and the Anglo-Saxons defeated a force of Scots, Danes, etc., in 937; locality very doubtful. The battle forms the subject of one of the oldest Anglo-Saxon poems.

Brunck, Richard Francois Philippe, rin'art frantz fē-lēp broonk, French critic b Strasburg, 30 Dec. 1729; d. same place, 12 June 1803. He made rapid progress in learning when he studied with the Jesuits in Paris, but neglected study as soon as he entered into active life. While in winter quarters at Giessen, as commissary of war during the French campaigns, he resided with a professor who, by his advice and example, revived his love of letters and led him to the study of the classics. When Brunck returned to Strasburg he devoted all his leisure time to Greek, and at the age of 30, and while holding public office, attended the lectures of the Greek professor of the university. The zeal which had encouraged him to undertake this laborious study was increased by the pleasure of overcoming difficulties, and he became fixed in the conviction that all the instances of apparently careless writing in the Greek poets were only errors of the transcribers. Entertaining this opinion, he altered whatever displeased him, overthrew the order of the verses, and permitted himself liberties which criticism must needs reject. To this rage of altering he gave himself up, particularly in the marginal comments of his books, and in the numerous copies which he made of the Greek poets, more for his own pleasure than for use. This arbitrary process is so visible, even in the editions he has published, that much caution is required in using them. Brunck has nevertheless been of essential service to Greek literature, and since the revival of letters few scholars have so effectually promoted it. He published a valuable edition of Virgil. Of his Greek editions mention may be made of those of the 'Analecta,' 'Apollonius Rhodius,' 'Aristophanes,' 'The Gnomie Poets,' and his masterpiece, 'Sophocles,' for which the king allowed him a pension of 2,000 francs. At this time the French Revolution interrupted his studies. He adopted the new ideas with enthusiasm, but without deviating from the principles of moderation. He was arrested at Besançon during the Reign of Terror, and did not obtain his liberty until after the death of Robespierre. In 1791 and again in 1801 economical reasons obliged him to sell part of his library. As he was passionately fond of his books, and his former fortune had enabled him to collect an excellent library, this was a severe privation. From this time Greek became his aversion; but he prepared an edition of Terence, and had Plautus ready for publication when he died in 1803. Many of his papers are in the library at Paris.

Brundu'sium, or Brundis'ium, now BRINDISI, brin-dē'sē, Italy, a city of Calabria, on the shores of the Adriatic. It was taken by the Romans 267 B.C., and became a colony of the republic 244 B.C. During the Illyrian war, 229 B.C., it was the naval and military station for the

Roman fleet and army, and its fine harbor rendered it on many subsequent occasions the centre of warlike operations. Virgil died here 19 B.C.

Brune, Guillaume Marie Anne, gē-yōm mā-rē an broon, French soldier: b. Brives la Gaillarde, 13 March 1763; d. 2 Aug. 1815. While young he went to Paris to study law. At the breaking out of the Revolution he was a printer and had made himself known by some small pieces of his own composition. He now devoted himself ardently to politics, was connected with Danton, and played an active part in the tempests of that period. Till 10 Aug. 1792 he was engaged in publishing a daily newspaper. Afterward he went as civil commissary to Belgium. In 1793 he entered the military service in the revolutionary army in the Gironde. He aided Barras to put down the Jacobins, who had assaulted the camp of Grenelle, 10 Oct. 1795. Afterward he distinguished himself as general of brigade in the Italian army, in the battle of Arcola and in the attack on Verona. When the directory of Switzerland declared war Brune received the chief command of an army, entered the country without much opposition in January 1798, and effected a new organization of the government. In 1799 he received the chief command in Holland, defeated the British, 19 September, near Bergen, and compelled the Duke of York to agree to the treaty of Alkmaar, 18 October, by which the British and Russians were to evacuate the north of Holland. In January 1800, he was made a councilor of state, and was placed at the head of the Army of the West, in occupation of La Vendée, and contributed greatly to the re-establishment of tranquillity in the revolted province. He was appointed commander-in-chief of the Italian army 13 August. Toward the end of December he led his troops over the Mincio, conquered the Austrians, passed the Adige 8 Jan. 1801, took possession of Vicenza and Roveredo, and concluded an armistice, 16 January at Treviso, with the Austrian general Bellegarde, by which several fortified places in Italy were surrendered to the French troops. When peace recalled him to the council of state toward the end of November 1802, he laid before the legislative body for confirmation the Treaty of Peace with the court of Naples. Next year he went as ambassador to Constantinople. He prevailed there at first over the British party, and received from the Turkish ministry the highest marks of honor; but when new dissensions arose between the two powers he left Turkey. During his absence, 19 May 1804, he was appointed marshal of the empire. At the end of 1806 Napoleon appointed him governor-general of the Hanseatic towns, and soon after commander of the troops in Swedish Pomerania against the king of Sweden. This monarch invited the marshal to a personal interview, in which he endeavored to convert him to the cause of Louis XVIII. Brune refused every proposal. After the revolution of 1814 he acknowledged Louis XVIII., and received the cross of Louis, but no appointment. This was the cause of his declaring himself for Napoleon immediately upon his return. He received the chief command of an important army in the south of France and was made a peer. When circumstances changed again he delayed a long time before he gave up Toulon, which was in his possession in 1815, to the troops of

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Louis XVIII., and sent in his resignation to the king. This circumstance, the severities exercised by his command, and a report that he was the murderer of the Princess Lamballe, excited popular feeling against him. While retiring from Toulon to Paris he was recognized at Avignon by a royalist mob, which broke into his hotel and shot him. His body was exposed to the most shameful insults, and then thrown into the river Rhone.

Brunei, or Bruni. See BRUNAI.

Brunel, broo-něl', Isambard, 'isam-bärd, Kingdom, English engineer: b. Portsmouth, (son of Sir Mark Isambard Brunel, q.v.), 9 April 1806; d. 15 Sept. 1859. He was educated at the Henri IV. College at Caen, France. The bent of his genius was toward mechanical pursuits, and at the age of 20 he commenced practical engineering under his father at the Thames Tunnel, for which he acted as resident engineer. During the progress of the works he was more than once in imminent danger of his life by the breaking in of the river, and only saved himself by swimming. His attention was mainly directed to steam navigation and railway engineering, and of his works in these departments may be mentioned, among others, the Great Western, Great Britain, and Great Eastern steamships; the entire works on the Great Western Railway, to which he was appointed engineer in 1833; and the railway viaduct over the Tamar at Saltash. He was also the engineer of the Hungerford suspension bridge. The genius of the younger Brunel was undoubted, but in carrying through his operations he was like his father, too apt to regard merely the attainment of a grand and brilliant result without taking into consideration the losses and expense which might thereby be occasioned to those who had invested their capital in the undertaking. This was more especially the case with the Great Western Railway. It was remarked, in contrasting him with George Stephenson, that the works of the former never paid, while those of the latter always did. While on board the Great Eastern—his last work—the day before she quitted the Thames on her first disastrous cruise, Mr. Brunel was suddenly seized with paralysis and had to be carried home. In a week afterward he expired. He became a Fellow of the Royal Society in 1830, and D.C.L. of Oxford in 1857.

Brunel, Sir Mark Isambard, English engineer: b. Hacqueville, near Rouen, 25 April 1769; d. 12 Dec. 1849. He was the son of a Normandy farmer, and educated at the seminary of St. Nicaise, Rouen. From early boyhood he displayed a decided turn for scientific and mechanical pursuits, amusing himself with the construction of ships, musical instruments, and machines of different sorts. At the age of 15 he went to Rouen, where he took a course of lessons in drawing, perspective, and hydrography. In 1786 he entered the French naval service and made several voyages to the West Indies, in which he distinguished himself both by his inventive mechanical genius and the attention and ability with which he discharged the duties of a seaman. In 1793 he returned to France, and, having paid a visit to Paris, and taken part in the proceedings at one of the political clubs, he narrowly escaped proscription by venturing to oppose the ferocious doctrines then

current, and was obliged to make his escape to America. Shortly after his arrival there he joined a party of Frenchmen in an expedition to explore the regions around Lake Ontario, and in 1794 he was appointed one of the surveyors of the canal now connecting Lake Champlain and the river Hudson. He was afterward employed, both as engineer and architect, on various undertakings in the city of New York, including the erection of forts for its defense and the establishment of an arsenal and foundry. In 1799 he went to England and settled at Plymouth, where he married Miss Sophia Kingdom, whom he had formerly known at Rouen. His first work in this country was the construction of a copying-machine; and he soon established his reputation as a mechanic by the invention of a machine for making the block-pulleys for the rigging of ships, which effected an immense saving in labor and expense and is still in full operation in English naval dockyards. Of Brunel's subsequent achievements may be mentioned more especially the erection of the steam saw-mill in Chatham dockyard; a machine for making seamless shoes for the army; machines for making nails and wooden boxes, for ruling paper and twisting cotton into hanks; and lastly, a machine for producing locomotion by means of carbonic acid gas, which, however, though partially successful, was ultimately abandoned. But the great work by which his name will be transmitted to posterity was the Thames tunnel, which, though almost a complete failure as a commercial speculation, was nevertheless a wondrous monument of engineering skill and enterprise. It was commenced in March 1825, and opened to the public in 1843, after a multitude of disasters and obstacles had been endured and surmounted. He was elected a Fellow of the Royal Society in 1814, and vice-president from 1832-3. In 1841 the honor of knighthood was conferred on him.

Brunelleschi, Filippo di Ser Lippi, fê-lêp' pō dē sār lăp'pē broo-něl-lêsh'ê, Italian architect: b. Florence, 1377; d. same place, 15 April 1446. He first studied painting and sculpture, and brought the art of perspective to perfection; but as an architect he gained most distinction, having, according to his countrymen, revived the Doric, Ionic, and Corinthian orders. He invented various ingenious mechanical contrivances. He applied himself particularly, however, to architecture; and learned the art of drawing to make his architectural plans; statuary, to adorn them; and mechanics, that he might be able to raise the materials. He was also profoundly versed in mathematics and geometry. He is said to have drawn views of the finest monuments in Florence in perspective—an art which then excited much astonishment. This varied knowledge prepared him for bold and difficult undertakings, and he gained the name of the restorer of architecture. As a statuary he was much indebted to his intimate connection with Donatello, who was then very young but very able. Both went to Rome. Here Brunelleschi conceived the idea of restoring architecture to the principles of the Greeks and Romans in the hope of making the revived classic forms supersede the Gothic then in vogue. When the architects assembled in 1407 at Florence to consult on the building of the dome of the Cathedral of Santa Maria, the plan which

Brunelleschi proposed received but little attention, and he went back to Rome.

It was necessary, however, to have recourse to him, as the undertaking far surpassed the powers of the other architects. He engaged to erect a dome which, by its own weight and by the strong connection of its parts, should hang suspended. This proposal seemed so wonderful that the author was regarded as insane. As all other plans, however, failed to answer the expectations of the magistrates, Brunelleschi was again recalled, and ordered to explain the mode in which he intended to execute his plan. This he refused to do, but built two small chapels according to his new system. On this the charge of erecting the dome was committed to him. Aided only by his own genius he accomplished the work, which remains one of the boldest creations of the human mind. But the ingenious lantern, which formed the upper part of the dome, was not finished when he died in 1444. It was completed, however, according to his first design. Few monuments of architecture are so noble as this wonderful building. Only the dome of St. Peter's in Rome, which was built since, excels it in height, but is inferior to it in lightness and grandeur of style. Michael Angelo said it was difficult to imitate Brunelleschi and impossible to excel him. Brunelleschi was the author of a great number of other masterpieces of architecture.

Brunet, Jacques Charles, zhāk shārl broōnā, French bibliographer: b. Paris, 2 Nov. 1780; d. same place, 14 Nov. 1867. He began his bibliographical career by the preparation of several auction catalogues, of which the most interesting is that of the Count d'Ourches (Paris 1811), and of a supplementary volume to Cailleau's and Duclos' 'Dictionnaire Bibliographique' (Paris 1802). In 1810 was published the first edition of his 'Manuel du Libraire et du l'Amateur de Livres,' in three volumes, which gained such universal applause that in 1814 a second, and in 1820 a third edition, of four volumes each, were demanded. This work showed him the worthy successor of the meritorious Debure. A sixth edition of his great work appeared between 1860 and 1865 in six volumes, the last containing a Table Méthodique, or classified catalogue, in which the works are arranged in classes according to their subjects.

Brunetière, Ferdinand, fār-dē-nōn brūn-tē-ār, French critic: b. Toulon, 19 July 1849. He is the editor of the *Revue des Deux Mondes* and became a member of the French Academy in 1893. In criticism he inclines to the idealist as opposed to the naturalist school, and is a severe critic of literary fads. His principal works are: 'History and Literature' (1884); 'The Naturalist Romance' (1883); 'Essays on Contemporary Literature' (1892); 'Epochs of the French Theatre' (1892). In 1897 he delivered a series of lectures in Harvard, Johns Hopkins, and Columbia universities.

Brunhilda, broon-hīl'da, the name of (1) a legendary, (2) a historical person.

1. In the 'Nibelungenlied,' the young and stalwart queen of Iceland, wife of Gunther, the Burgundian king. She passionately hated Kriemhild and her husband, Siegfried, who had once been her own lover; and she caused his murder by the hands of Hagen. Originally she was identical with the Norse Walkyrie Bryn-

hildr, who, for a fault, was stripped of her divinity by Odin and sank into a charmed sleep, from which she was awakened by Sigurd (Siegfried).

2. The daughter of the Visigothic king Athanagild, who married King Sigbert of Austrasia in 567, and afterward, as regent of her two grandsons, Theodebert II., king of Austrasia, and Theodoric II., king of Burgundy, divided the government of the whole Frankish world with her rival Fredegunda, who governed Neustria for the youthful Clotaire II. On the death of Fredegunda in 598, she seized on Neustria, and for a while united under her rule the whole Merovingian dominions, but was overthrown in 613 by a combination in their own interests of the Austrasian nobles under the nominal leadership of Clotaire II., and put to death by being dragged at the heels of a wild horse.

Bruni, broō'nē, Bru'no, or Bru'nus, Leonardo, lā-o-nar'do ("ARETINO," from his birth-place), Italian humanist: b. Arezzo, 1370; d. Florence, 9 March 1444. He studied law and philosophy at Florence, but under the influence of the Greek scholar Chrysoloras finally took up the study of the classics. In 1405 he obtained a position as papal secretary, an office which he held under four Popes, Innocent VII., Gregory XII., Alexander V., and John XXIII. He went with the latter to the council of Constance in 1414, but in 1415 he moved to Florence, where he devoted himself to literary work. Here he wrote his history of Florence in 12 volumes, for which service he obtained the right of citizenship and was made state secretary there in 1427. He translated the works of Aristotle, Plato, Plutarch, Demosthenes, and Æschines. He wrote also 'Commentarius Rerum Suo Tempore Gestarum'; 'De Origine Urbis Mantuæ'; 'De Romæ Origine'; and 'Epistolæ Familiares.'

Bruni, brōō'nē, Island, Australasia, an island off the southern part of the east coast of Tasmania, from which it is separated by D'Entrecasteaux Channel. It has a length of 32 miles, a varying breadth of 1 to 11 miles, and an area of 160 square miles. Coal is mined.

Bru'nings, Christian, Dutch engineer: b. Neckerau, 1736; d. 1805. In 1769 the states of Holland appointed him general inspector of rivers. This introduced him to a share in several important commissions; for instance, that for the improvement of the dike system in 1796; that for draining the tracts between Nieuwskogs and Zevenhoven in 1797, etc. His most important works were his improvements in the diking of the lake of Haarlem, the improved diking and deepening of the Oberwasser, which at high tides often inundated vast extents of country, together with the change in the course of the Waal and the canal of Panterde, by which the beds of the Rhine, the Waal, and the Leck were improved.

Brunn, Heinrich von, hīn'rīn brun, German archaeologist: b. Wörlitz, Anhalt, 23 Jan. 1822; d. Munich, 23 July 1894. He was professor of archaeology at Munich, and published several works of high repute among scholars.

Brünn, Austria, the capital of Moravia, and of a circle of the same name, situated on the railway from Vienna to Prague, 70 miles north-by-east of Vienna, and nearly encircled by the rivers Schwarza and Zittawa. It con-

sists of an older portion in the centre, surrounded by fine promenades and pleasure-grounds that have taken the place of the old walls and ramparts, and of extensive newer quarters and suburbs surrounding this. It contains a cathedral and other handsome churches; a landhaus, where the provincial Diet meets; several splendid palaces, a gymnasium, polytechnic institute, museum, botanic garden, etc. It has extensive manufactures of woollens, which have procured for it the name of the Austrian Leeds, and in some 70 works employs about 12,000 hands. Other industries embrace cotton, linen, jute, machinery, hardware, chemicals, soap, and candles; beer and spirits. It is the centre of the Moravian commerce, a great part of which is carried on by fairs held at Brünn every three months. Near it is the fortress of Spielberg, on a hill about 940 feet high, in which Baron Trenck and Silvio Pellico were confined, and which now serves only as a prison. It is surrounded with finely laid-out grounds. Brünn was formerly a free imperial city, an important fortress, and the residence of the margraves of Moravia. It was unsuccessfully besieged by the Taborites in 1428; by Torstenson in 1645; by the Prussians in 1742. It was occupied by the French in 1805, and Napoleon made it his headquarters after the battle of Austerlitz. It was taken again by a division of the French army in 1809, when it suffered severely. In 1866 it was occupied by the Prussians. Pop. (1900) 109,000

Brunne, brūn, Robert of, the name by which ROBERT MANNING, a monk of the order founded by St. Gilbert of Sempringham, is usually designated. His monastery was in Lincolnshire, near the modern town of Bourn, and he lived in the reigns of Edward II. and Edward III. His chief work is his 'Handlyng Synne,' a free and amplified translation into English verse of William of Waddington's 'Manuel des Pechiez,' with such judicious omissions and excellent additions as made his version much more entertaining than the original. The purpose of the book was to convey religious instruction to the people in the agreeable form of moral anecdotes. It is of great importance from the linguistic point of view, as one of our best landmarks in the transition from the early to the later Middle English. He also made a new version in octosyllabic rhyme of Wace's 'Brut d'Angleterre,' and added to it a popular translation of the French rhyming chronicle of Peter Langtoft of Bridlington. Robert deliberately wrote in English instead of French, in order to reach the common people, to give them the means "for to haf solace and gamen, in felaschship when tha sit samen (together)."

Brunnow, broo'nöff, Philipp (COUNT VON), Russian diplomatist: b. Dresden, 31 Aug. 1797; d. Darmstadt, 12 April 1875. He entered the Russian service in 1818. He was present in a civil capacity in the campaigns of 1828 and 1829 against the Turks, and in 1839 was sent on a special mission to London, where, in the following spring, he was accredited as permanent ambassador. In this capacity he soon acquired distinction as a diplomatist. After retiring from London on the outbreak of the Crimean war, in 1854, he represented Russia in Frankfurt, and, together with Count Orloff, was sent to the Conference of Paris in 1856. He was afterward

appointed to the court of Prussia; but in 1858 he returned to his old place in London, where he represented Russia at the conferences in 1864 and 1871. He was raised to the rank of count in 1871, and in 1874 retired to Darmstadt.

Bru'no, St., the name of two saints of the Roman Catholic Church.

1. The apostle of Prussia: b. about 970; d. 1008. He entered the order of St. Benedict and accompanied St. Adalbert on his mission to Prussia. He was appointed chaplain to the emperor, Henry II., and was a zealous missionary in Poland, Russia, and Hungary. Having been taken by the pagans of Lithuania, he had his hands and feet cut off, and was afterward beheaded.

2. The founder of the Carthusian order: b. Cologne about 1030; d. Della Torre, Calabria, 1101. He was educated in the school of the collegiate church of St. Cunibert, in which he afterward received a canonship, and then studied at Rheims, where he so distinguished himself that Bishop Gervais appointed him to superintend all the schools of the district. He attracted many distinguished scholars, and among others Odo, afterward Pope Urban II. Subsequently he was offered the bishopric of Rheims, but the immorality of his times induced him to go into solitude. In 1084 or 1086 he repaired with six friends of a like disposition to a narrow, bleak valley, called Chartreuse, about 15 miles from Grenoble, where they built an oratory and separate cells, and founded one of the severest orders of monks, named from their location Carthusians. In the meantime Urban II. became Pope, and in 1089 invited his former instructor to his court. Bruno reluctantly obeyed, but refused every spiritual dignity, and in 1094 received permission to found a second Carthusian establishment in the solitude of Della Torre, in Calabria, where he died. Leo X., by whom he was beatified, in 1514, permitted the Carthusians to celebrate a mass in honor of him; and Gregory XV., who ordered the process of his canonization, in 1623 extended it to the whole Roman Catholic Church.

Bruno, Giordano, jôr-dă'nô broo'nô, Italian philosopher: b. Nola, Naples, about 1550; d. Rome, 16 Feb. 1600. He entered the order of Dominicans and became distinguished by the originality and poetical boldness of his speculations. In 1580, probably on account of the persecutions which he drew upon himself by his religious doubts and his satires on the monks he was forced to take refuge at Geneva. Here, however, he was soon persecuted by the Calvinists for his paradoxes and his violence. In 1583 he stood forth at Paris as the antagonist of the Aristotelian philosophy, and as teacher of the *ars Lulliana*. His disputes with the Aristotelians caused him to leave Paris, and he then went to London, where he published several of his works, and to Oxford, where he taught for a short time. In 1585 he went by way of Paris and Marburg to Wittenberg, and from 1586 to 1588 taught his philosophy there. He then went to Helmstadt, where, protected by Duke Julius of Wolfenbüttel, he remained till 1589. He was then engaged at Frankfort-on-the-Main with the publication of some works, particularly 'De Monade, Numero, et Figura,' but left this city in 1592, and returned to Italy. He remained

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peacefully in Padua until 1598, when the inquisition of Venice arrested him and transferred him to Rome. After an imprisonment of two years, that he might have opportunity to retract his doctrines, he was burned for apostasy, heresy, and violation of his monastic vows. This death, which he might have averted eight days before by a recantation, he suffered with fortitude. While his violent attacks on the prevailing doctrines of the Aristotelian philosophy, and on the narrow-minded Aristotelians themselves, everywhere created him enemies, his rashness and pride threw him into the hands of his executioners. His philosophical writings, which have become very rare, display a classical cultivation of mind, a deep insight into the spirit of ancient philosophy, wit, and satire, as well as a profound knowledge of mathematics and natural philosophy. In 1585 appeared at Paris his famous 'Spaccio della Bestia Trionfante' (a moral allegory, with many satirical strokes on his own times); also his work 'Della Causa, Principio ed Uno' (Venice and London 1584); besides 'Del Infinito, Universo, e Mondì.' The former contains the foundation, the latter the application of metaphysics to the natural world. The doctrine is a pure Pantheism, connected with very peculiar notions of God—*Deus est monadum monas, nempe entium entitas*—a more complete Pantheistical system than had been previously exhibited, and which, since his time, Spinoza only—who, like Descartes, borrowed his ideas—has reduced to a more systematic form. The notion that God is the soul of the universe, and the world endowed with organization and life, might have been forgiven by his contemporaries; but his inference that the world is infinite and immeasurable, and his doctrine of the plurality of worlds, at the moment when the new system of Copernicus was attacked from all quarters, could not but be looked upon as a crime. His writings are mostly in the form of dialogues, without any methodical order. His language is a strange mixture of Italian and Latin. His style is violent and fiery. The originality and loftiness of his ideas take a powerful hold on those who can understand him. His logical writings, in which he boldly and skilfully applies Raymond Lully's art of topical memory, are more obscure and less interesting. His belief in magic and astrology, notwithstanding his enlightened views of the nature of things, is to be attributed to the spirit of his age. He also wrote poems, among others, 'Degli Eroi Furori,' and a satirical comedy, 'Il Candelajo.' A collection of his Italian works by Wagner appeared at Leipsic in 1830. A biography by Domenico Berti (Florence 1868), is of special interest and importance on account of the new papers it brings to light regarding the official examination of Bruno before the Inquisition of Venice.

Bruno the Great, German ecclesiastic: b. 925; d. Rheims, 11 Oct. 965. He was the Archbishop of Cologne, third son of Henry the Fowler, and brother of the Emperor Otho I. He had a great share in the events of his time, and surpassed all the contemporary bishops in talents and knowledge. He was made Archbishop of Cologne in 953, and Duke of Lorraine in 954, and had much trouble in bringing into due subjection his unruly subjects. A numerous train of learned men from all countries, even from Greece, continually followed him, and his

excellent example was imitated by many prelates. Commentaries on the five books of Moses, and the biographies of some saints, are ascribed to him.

Brunonian Theory, an hypothesis framed by Dr. John Brown, 1735-88 (q.v.), according to which the living system was regarded as an organized machine endowed with excitability, kept up by a variety of external or internal stimuli, that excitability constituting life. Diseases were divided into sthenic or asthenic, the former from accumulated and the latter from exhausted excitability. Darwin, author of the 'Zoonomia,' adopted the theory with enthusiasm, and Rasori introduced it into Italy, where it flourished for a time, and then had to be abandoned, as it ultimately was everywhere.

Brunswick, Ferdinand, Duke of, German soldier: b. Wolfenbützel, 11 Jan. 1721; d. Brunswick, 3 July 1792. He was the fourth son of Duke Ferdinand Albert, and was educated for the military profession. In 1739 he entered the Prussian service, was engaged in the Silesian wars, and became one of the most eminent generals in the Seven Years' War (q.v.). He commanded the allied army in Westphalia, where, always opposed to superior forces, he displayed superior talents. He drove the French from Lower Saxony, Hesse, and Westphalia, and was victorious in the two great battles of Crefeld and Minden. After the peace he resigned his commission on account of a misunderstanding with the king. From that time he lived at Brunswick, the patron of art and literature.

Brunswick, Friedrich Wilhelm, Duke of, German soldier: b. 9. Oct. 1771; d. Quatre Bras, 16 June 1815. He was the fourth and youngest son of Duke Karl Wilhelm Ferdinand of Brunswick (q.v.). He was educated for the army, and in 1786 was appointed by the king of Prussia successor of his uncle, Frederick Augustus, Duke of Oels and Bernstadt. He then went to Lausanne, remained two years in Switzerland, and upon his return was made captain in a Prussian regiment of foot. During the war against France in 1792 and the following year he fought in the Prussian armies and was twice wounded. In 1806 he took part in the war against France with all the fire which the oppression of Germany and his father's unhappy fate had kindled in him. He finally joined the corps of Blücher, and was made prisoner with him at Lübeck. On the death of his eldest brother he would have succeeded to the dukedom, as his other brothers were incapacitated by disease, but Napoleon prohibited his succession. He raised a free corps in Bohemia to operate against the French, but though he gained a victory over 4,000 Westphalians he was unable to make an effectual stand on the Continent. He embarked his troops for England, landed in 1809, and was received with enthusiasm. His corps immediately entered the British service, and was afterward employed in Portugal and Spain. The Parliament granted him a pension of £6,000 until he returned to his hereditary dominions, 22 Dec. 1813. The events of 1815 called him again to arms, and he fell at Quatre Bras.

Brunswick, House of, a royal German house, the true founder of which was Albert Azo II., Marquis of Reggio and Modena, a descendant, by the female line, of Charlemagne, who had also extensive domains in Lombardy,

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and in 1047 married Cunigunda, heiress of the Counts of Altorf, and thus united the two houses of Este and Guelph. The previous history of the Este family is uncertain. Guelph, the son of Azo, was created Duke of Bavaria, in 1071. He married Judith of Flanders, who was descended from Alfred the Great of England. The most powerful of this line was Henry the Proud, who succeeded in 1125, and by his marriage with the daughter of Lotharius II. acquired Brunswick and Saxony. Brunswick ultimately fell to a younger branch of the family, and Otho, the great-grandson of Henry by this branch, was the first who bore the title of Duke of Brunswick (1235). John, eldest son of Otho, founded the house of Lüneburg. Albert the Great, a younger son of Otho, conquered Wolfenbüttel, and on his death (1278) his three sons divided his dominions. Henry founded the house of Grubenhagen, Albert became Duke of Brunswick, and William Duke of Brunswick-Wolfenbüttel. Henry Julius, of this last branch, inherited Grubenhagen (1596). Ernest of Zell, of the second branch, who succeeded (1532), conquered the territories of Wolfenbüttel, and left two sons, by whom the family was divided into the two branches of Brunswick-Wolfenbüttel (II.) or Brunswick-Lüneburg, and Brunswick-Hanover from the latter of which comes the present royal family of Great Britain. The former was the German family in possession of the duchy of Brunswick down to 1884, when this line became extinct on the death of the last duke, Wilhelm I., who ascended the throne of the duchy in 1831. Ernest Augustus, of the Brunswick-Hanover House, was created Elector of Hanover in 1692. He married Sophia, daughter of Elizabeth, the daughter of James I. of England. Their son George succeeded his father as Elector of Hanover in 1698, and was called to the throne of Great Britain as George I. in 1714, under the Act of Settlement of 1701, which invested the succession in the heirs of the Princess Sophia, being Protestants. The British sovereigns continued to rule Hanover till the accession of Victoria, when the Duke of Cumberland succeeded. The present Duke of Cumberland, titular Duke of Brunswick and king of Hanover, would have become ruler of Brunswick but for the events which transferred Hanover to Prussia; and Prince Albert of Prussia was elected regent of Brunswick instead.

Brunswick-Lüneburg, Karl Wilhelm Ferdinand (DUKE OF), German soldier: b. (eldest son of the reigning duke, Charles of Brunswick, and of a sister of Frederick the Great) 9 Oct. 1735; d. Ottensen, near Altona, 10 Nov. 1806. He was carefully educated, and his military ambition was early kindled by the achievements of Frederick II. He commanded the Brunswick troops in the allied army in the Seven Years' war, and in the fatal battle at Hastenbeck, 28 July 1757, he recaptured a battery that had been taken by the French; calling forth from Frederick a statement that "he showed that nature had destined him for a hero." He was instrumental in deciding the victory of Crefeld. He took the most active part in all the enterprises of his uncle Ferdinand; and Frederick's esteem for him continued to increase. In 1764 he married the Princess Augusta of England. He practised the greatest economy, living mostly retired from public business, and devoted to

the arts and sciences. In 1773 he entered the Prussian service and became general of infantry, but had no opportunity of displaying his military talents. After the death of his father (1780) he entered upon the government with zeal and activity. Anxious for the improvement of the finances, he diminished his household, discharged the debts of the state, encouraged agriculture, extended the liberty of commerce, undertook or assisted in the erection of considerable buildings, and by causing Italian operas, masquerades, etc., to be exhibited gratis, provided also for the amusement of the public. Yet, with the best intentions, he was often unsuccessful. This was the case with his plans for the improvement of public education. He invited men of learning into the country at great expense, but the projected reformation having met with innumerable obstacles, they became a burden to the state. In 1787 he commanded a Prussian army for the support of the stadtholder of Holland. When the wars of the French Revolution broke out, he received the chief command of the Austrian and Prussian army, and issued at Coblenz, 15 July 1792, a manifesto, drawn up in a very haughty style, which did more injury to the allied forces than a hostile army could have done. The duke designed to press forward from Lorraine to Paris to cut off its supplies, and thus force it to surrender by famine. Longwy was taken, 23 August, and Verdun, 2 Sept. 1792. But in Champagne, a country of itself unproductive, the transport of provisions for the army from the frontiers was rendered difficult by mountains and forests. Dumouriez was encamped in the vicinity of St. Menchould, and skirmishes took place daily; but the skilful dispositions of Dumouriez culminated in the defeat of the Germans by Kellermann at Valmy, 20 Sept. 1792, and Brunswick-Lüneburg was obliged to conclude an armistice and evacuate Champagne. Custines took Worms and Spire during this retreat, and captured the fortress of Mainz, 21 October, and soon afterward Frankfurt, which latter city, however, was retaken by the Prussians and Hessians, 2 December. The endeavors of the Germans, therefore, were principally directed to the recapture of those places. To this end the Duke, in conjunction with the Austrians, opened the campaign on the upper Rhine, in 1793, took the fortress of Königstein 7 March, conquered Mainz 22 July, and prepared to attack the strong fortress of Landau, then in the power of the French. The French, on the other hand, 14 September, made a general attack on the Duke and Wurmser, from Strasburg to Saarbrück. On that day the Duke had a sanguinary engagement with Moreau in the vicinity of Pirmasens, a town belonging to the landgraviate of Hesse-Darmstadt. The French were driven from their camp near the village of Hornbach as far as the Saar. A month later the Duke, having formed a union with Wurmser, succeeded, 13 October, in his attack on the lines of Weissenburg and his attempt to draw nearer to Landau. In order to gain another strong point of support he ventured, on the night of 16 November to make an assault upon the mountain-fortress of Bitche, which is the key of the Vosges, as the roads from Landau, Pirmasens, Weissenburg, and Strasburg unite at that place. This attempt miscarried. Between the 28th and the 30th of November, however, he defeated

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a division of the army of the Moselle at Lautern, which was pressing through the mountains, under the command of Hoche, with the intention of relieving Landau. But the daily attacks of Hoche and Pichegru, without regard to the sacrifice of men, and the successful attempt of the latter to break the Austrian lines near Fraschweiler, 22 December, forced the Austrians to retreat beyond the Rhine, and occasioned the retreat of the Duke also. As some difficulties had already risen between Austria and Prussia, he laid down the chief command of the army in the beginning of the year 1794. The Duke continued to labor for the welfare of his country until 1806. Although now of such an age that he might have retired without reproach from public life, yet he assumed burdens beyond his powers. At the beginning of the year 1806, commissioned by the king of Prussia, he made a journey to St. Petersburg relative to the war that soon broke out with France. He was then placed at the head of the Prussian army. But his physical strength was not equal to his moral energy, as was proved by the battles of Jena and Auerstädt, in the latter of which he was mortally wounded.

Brunswick, Ga., a city and county-seat of Glynn County, situated on St. Simon's Sound, eight miles from the Atlantic Ocean; on the Plant System and the Southern R.R.'s; 80 miles south-southwest of Savannah. Its settlement dates back more than 100 years, and its importance as a commercial port has been developed since the close of the Civil War. It has an admirable and spacious harbor, provided with a brick lighthouse; is connected with New York, Fernandina, and Savannah by regular steamship lines; and exports large quantities of cotton, phosphates, tar, turpentine, and pine lumber. The city is the seat of a U. S. marine hospital and is a popular summer and winter resort, with fine hotels. Pop. (1900) 9,081.

Brunswick (Ger., BRAUNSCHWEIG), Germany, a duchy and sovereign state in the north-west part of the Germanic empire, comprising an area of 1,425 square miles. It is divided into eight districts—three larger and five smaller, detached from each other and surrounded by foreign possessions. About one half of the land is arable. Of the cultivated area of Brunswick 75 per cent belongs to private persons, 14 per cent to corporations, and 11 per cent to the state. The minerals are of some importance, including iron, lead, copper, some gold and silver, salt, asphalt, peat; besides marble, granite, sandstone, and other kinds of stone. The forests cover a considerable area, and over 72 per cent of this is in the hands of the state. The most important cultivated crops are grain, flax, hops, tobacco, potatoes, the sugar-beet, and fruits. A good deal of attention has been given in recent times to the improvement of the breeds of cattle, sheep, and horses. The industrial occupations are varied if not individually important, and embrace beet-root sugar, tobacco and cigars, paper, glass, flax, jute, and woolen goods, hats, wooden wares, chemicals, porcelain, sewing and other machines, lacquered wares, sal-ammoniac, chicory, and madder. The lacquered wares and porcelain of Brunswick are famous even in foreign countries. Brunswick, the capital, is the centre of trade. In 1806 the duchy was annexed by Napoleon to the kingdom of

Westphalia, but its native prince, Frederick William, was restored in 1813. In the German Confederation Brunswick held the 13th rank, with two votes in the Assembly and one along with Nassau in the Diet. It was afterward a member of the North German Union, formed after the dissolution of the old confederation by the victories of Prussia in the short campaign of 1866. As a state of the German empire it now sends two members to the Bundesrath and three deputies to the Reichstag. In its internal government Brunswick is a constitutional monarchy. The Representative Assembly consists of 21 deputies of the principal taxpayers, 10 of towns, 12 of communes, and 3 of the clergy. The estimated revenue and expenditure for 1898-9 were respectively \$3,686,250 and \$3,610,000; the debt \$15,571,600. The prevailing religion is the Lutheran. Pop. (1895) 434,213.

Brunswick, Germany, capital of the duchy of the same name (q.v.), situated on the Ocker, and on the railway from Hanover to Berlin. It was formerly one of the free cities of Germany, but it is now subject to the duke, and has been the ducal residence since 1754. The principal buildings are the new ducal palace, the mint, the house in which the Diet assembles, the town-house, the arsenal, the cathedral, museum, and picture gallery, and the public wine cellars. The ramparts of the old fortifications have been levelled and formed into a promenade. The older streets are narrow and tortuous, and antiquated in appearance. The Collegium Carolinum was founded in 1745, and intended as a medium between the common schools and the universities. It has enjoyed a high reputation even in foreign countries, particularly in England and Russia. The principal manufactures are wool, yarn, linen, porcelain, pasteboard, paper-hangings, and chemical preparations. There is a large commerce in grain, woolens, and manufactured articles. The traffic in home produce, and the carrying trade, have been much increased by the system of railways. The Brunswick fairs, though now declining, were formerly of great importance. Pop. (1895) 115,938.

Brunswick, Me., a town in Cumberland County, situated on the right bank of the Androscoggin, 26 miles northeast of Portland; pop. of township in 1891, 6,012. The falls of the Androscoggin afford excellent seats for several mills and manufactories. Bowdoin College (q.v.) is located here, and connected with it is the Medical School of Maine, established in 1820. Pop. (1900) 6,800.

Brunswick Black, a quick-drying varnish, made of turpentine, asphaltum, and linseed oil. It is used as a lacquer for roughly coating finished iron work, and also in the preparation of microscopic slides.

Brunswick Green, a green pigment, prepared by exposing copper turnings to the action of hydrochloric acid in the open air. It is a pale bluish-green, insoluble, cupric oxychloride, $\text{CuCl}_2 \cdot 3\text{CuO} \cdot 4\text{H}_2\text{O}$. It derives its name from Brunswick, Germany, where it was first made by Gravenhorst.

Brun'ton, Mary (BALFOUR), Scotch novelist: b. Burra Island, in the Orkneys, 1778; d. 1818. In her 20th year she married Dr. Alexander Brunton, minister at Bolton, near Hadding-

ton; afterward at Edinburgh. She wrote 'Discipline' and 'Self-Control,' two novels which met with favor. At her death she left 'Emmeline,' a tale, and other pieces, which were published by Dr. Brunton, with a biographical sketch.

Brush, Charles Francis, American scientist: b. Euclid, Ohio, 17 March 1849. He graduated at the University of Michigan in 1869. He invented the modern arc system of electric lighting and founded the Brush Electric Company. He was decorated by the French government in 1881 for his achievements in electrical science. In 1891 he won a long contest in the Federal courts over the rights to the manufacture and sale of storage batteries; and in 1900 he was awarded the Rumford medal by the American Academy of Arts and Sciences.

Brush, Edward N., American physician: b. Glenwood, Erie County, N. Y., 23 April 1852. He was educated at the University of Buffalo, edited the 'Buffalo Medical Journal' (1874-89), and was assistant in the State Lunatic Asylum at Utica, 1878-84, and in the Pennsylvania Hospital for the Insane at Philadelphia, 1884-91. In the year last named he became physician-in-chief of the Shepard and Enoch Pratt Hospital, Baltimore. He has written much upon the subject of insanity and was associate editor of the 'American Journal of Insanity' 1878-84, and also from 1897.

Brush, George De Forest, American artist: b. Shelbyville, Tenn., 28 Sept. 1855. He studied under Gérôme in Paris and first attracted attention by his pictures of Indian life. His later work is almost entirely figure composition. He exhibited 'The Artist,' and 'Mother and Child,' at the Paris Exhibition of 1900, and received its gold medal. He is a member of the Society of American Artists and an associate of the National Academy of Design.

Brush, George Jarvis, American mineralogist: b. Brooklyn, N. Y., 15 Dec. 1831. He received a public school education and graduated at Yale, where he studied science in 1852. He subsequently studied in Germany. Since 1855 he has held professorships at Yale—that of metallurgy down to 1864, and that of mineralogy since that date. He has been a leading official of the Sheffield Scientific School since 1864. His writings on mineralogy are authoritative.

Brush, an instrument used for painting, or for removing dirt by light rubbing, from floors, furniture, etc. They are generally made of hair, bristles, whalebone, or of various vegetable fibres, and are divided into two classes—simple and compound. Simple brushes are composed of a single tuft, and compound brushes consist of several tufts inserted in a handle. Painters' brushes are examples of the former, and ordinary hair brushes of the latter.

Brush-bird. The scrub-bird (q.v.) of Australia.

Brush-grass (*Andropogon gryllus*), a grass of South Europe, with stiff wiry roots which are used for making brushes.

Brush-turkey, a mound-building game-bird of Australia, *Cathartus lathamii*. See MEGAPODES.

Brus'sa, or **Brous'sa**, Asia Minor, a Turkish city, and capital of the vilayet of Khodavendikyar, situated in a fertile and finely wooded plain, which is enclosed by the ridges of Olympus, and abounds in hot, sulphurous and chalybeate springs, which are much frequented. A railway runs between Brussa and Mudania, its port, on the Sea of Marmora. The inhabitants are Turks, Greeks, Armenians, and Jews, engaged in commerce, in the culture of the vine, and in the manufacture of carpets, gauze, etc. A considerable number of persons are employed in mulberry culture, the reeling of silk, and silk manufacture. Brussa silks being in great demand throughout the Orient, though much raw silk is sent to Lyons to be manufactured. Caravans passing from Aleppo and Smyrna to Constantinople promote the commerce of the town. Before the earthquake of 1855 it contained close upon 150 mosques, and was adorned with an immense number of fountains; but from the earthquake and a terrible conflagration the former splendor of the town suffered greatly. It is a picturesque and interesting place, however, gardens, groves, and streams of running water being interspersed among the buildings. The castle, which is about a mile in circumference, is supposed to represent the Prusa of the ancients. Brussa was long the capital of Bithynia, and one of the most flourishing towns in the Greek empire of Constantinople. In 1326 it was taken by Orkhan, son of Othman, founder of the Ottoman dynasties; and from that epoch it was the residence of the Turkish sovereigns until the seat of empire was transferred to Adrianople. Pop. about 76,000.

Brussels (Flem. BRUSSEL; Fr. BRUXELLES), of the province of South Brabant, Belgium, a city of which it is the capital, and also the capital of the country. It is situated on the small river Senne, about 50 miles southeast of the German Ocean; lat. 50° 51' N.; lon. 4° 22' E. Brussels is built partly on the acclivity of a hill, partly on the plain, in a country agreeably diversified by sloping heights. Like many other Continental towns whose political situation has changed, its old fortifications have been transformed into boulevards. These surround the older portion of the city, extending for nearly five miles; they are planted with elms and linden trees in four rows, and form a wide and agreeable promenade commanding an extensive view of the surrounding country. The numerous gates, most of which bear the names of the principal high roads or railways which traverse the kingdom, are nearly all modern, but the Porte de Hal, built in 1379, is a remnant of the ancient fortifications, a large military tower of remarkable construction, which in later days was long used as a prison. The city now extends far beyond the boulevards. The Senne enters it by two branches, great part of one of these being now covered over. The stream is not navigable, but Brussels possesses water communication by means of canals with Charleroi, Mechlin, Antwerp, and the ocean. In many quarters within the boulevards Brussels still presents a congeries of twisted streets. That part of the upper or new town inside the boulevards, which contains the royal palace, is the principal exception. The suburbs, outside the boulevards, especially in the upper town, are large, and have recently greatly increased. The principal are the

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Quartier Leopold and the Quartier Louise, which are regularly and elegantly built. The principal buildings of the new town are the king's palace, the palace of the chambers, the palace of justice (a magnificent new building of colossal proportions in the classical style), the palace of the fine arts, the public library and museum, etc. The upper town is ornamented with a fine park of 17 acres, with fountains and statues, around which most of the principal buildings are situated. The lower town is rich in ancient architecture. The hôtel de ville (built 1401-55), one of the finest municipal buildings in Belgium, is an imposing Gothic structure with a spire 364 feet high. The square in front of it is perhaps the most interesting of all the public places of Brussels. The cathedral of St. Gudule is the finest of many fine churches, richly adorned with sculptures and paintings. It was founded in 1010, and its reconstruction, commenced in 1226, was carried on till the 17th century. The churches of Notre-Dame-de-la-Chapelle and Notre-Dame-des-Victoires are also edifices of great beauty. The monuments of Brussels, and the specimens of painting and sculpture with which its public buildings are adorned, are too numerous to mention.

The manufactures and trade of Brussels are greatly promoted both by its canal communications and by the network of Belgian railways. Printing, type-founding, and all the other departments of bookmaking give employment to a large section of the population. Until 1852 the reprinting of French contemporary works was extensively carried on, but in that year a treaty with France gave protection to works of literature and art. Lace was an ancient manufacture, and is still of some importance; the printing of cotton and woolen fabrics, muslins, etc., and many minor manufactures are carried on. Brussels carpets are chiefly made at Tournai, but some are manufactured in the city. There are breweries, distilleries, sugar refineries, foundries of iron and brass, steam engine factories, etc. The trade carried on by the canals and railways is that of a capital city and manufacturing town, for the supply of internal wants and the distribution of its own products. The languages spoken in Brussels are French, and Flemish or Dutch, the former principally spoken in the new town, the latter chiefly in the old. English is also a good deal spoken, owing to the number of English residents and visitors.

The scientific, literary, artistic, and benevolent institutions of Brussels comprise a free university, founded in 1834, a proprietary institution, with about 60 professors and assistants, comprising four faculties, mathematical and physical sciences, belles-lettres, law, and medicine; a school of geography, founded in 1830, with an extensive museum, embracing geology, chemistry, and natural history; one of the finest observatories in Europe, the Belgian Royal Academy of Sciences, Letters, and Fine Arts, and the Royal Academy of Fine Arts; the public library, containing 350,000 volumes and 30,000 valuable manuscripts; the picture gallery, with the finest specimens of Flemish art; the Royal School of Medicine; many institutions for elementary education; societies of horticulture and other natural sciences; several hospitals; an infirmary; a philanthropic society, etc.

During the Middle Ages Brussels did not attain the extent or importance of several other cities of the Low Countries. The Emperor Otho dated a decree from Brussels in 976. It was walled by Baldric, Count of Louvain, in 1044. It was more completely fortified in 1380, the wall then following nearly the line of the present boulevard. During the 15th century it was twice burned and once ravaged by the plague. It was the scene, in 1568, of the execution of Counts Egmont and Horn. It was bombarded and burned by the French in 1695, and was the headquarters of Marlborough after the battle of Ramilies. It was taken by the French in 1794, and retained till 1814, when it became the chief town of the department of the Dyle. From 1815 to 1830 it was one of the capitals of the kingdom of the Netherlands, and in 1830 it was the chief centre of the revolt which separated Belgium from Holland. Since then it has been the capital of the Belgian kingdom, and one of the centres of European civilization, being especially distinguished, far beyond its relative importance, for the cultivation and patronage of art. The population of Brussels, including the suburbs, 1 Dec. 1897, was 551,011.

Brussels Carpet. See CARPET.

Brussels Conference, the current name of two abortive international conferences: one on the usages of war, July-August 1874; the second on bimetallism, in the autumn of 1892.

1. The harsh treatment of prisoners and non-combatants in the Franco-German war aroused a humane feeling in protest. At the Congress of Universal Alliance in Paris, June 1872, a Society for the Improvement of the Condition of Prisoners of War was formed, which sent a circular to the chief European powers asking them to appoint delegates to a congress on this subject at Paris. England and France declined, because the request came from no official source; but Russia substituted a project of her own, and Gortchakoff invited the powers to a conference at Brussels, ostensibly to lay before them a proposal for "a code to determine the laws and usages of warfare, and to limit the consequences and diminish the calamities consequent upon war, as far as it may be possible or desirable." England, however, sent but one delegate, the United States none, and the South American states were refused any share. To the dismay of the promoters, the meeting was at once turned into an engine for the exact reverse of their intentions. The dominating force throughout was that of Germany and Russia, whose views and purposes were identical; and it soon became clear that the real object of the call was to strengthen their hands as militant states by throwing overboard the entire fabric of international law on the obligations of humanity, and substituting the baldest assertion of the naked rights of irresponsible force. The original topic of prisoners of war, when brought up, was refused discussion by the Russian delegate, Jomini, on the ground that the governments did not wish to hamper themselves. The question of revising the articles of the Geneva Convention (q.v.) on the treatment of the sick and wounded, and the neutrality of clergymen, physicians, etc., attending them, was also thrown out by him, on the ground that for military reasons it was necessary to revise the whole convention, and that the states "most apt in the

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initiative of war" should have the right to "insist on their necessities." The question of what constitutes "effective occupation" was still more vital. The obvious interest of aggressive states was to insist, as did Germany, that it "need not manifest itself by visible signs," so that a town once occupied should still be considered so even if the troops were removed, and any rising of the inhabitants be punishable as treason; and that it was sufficiently established by "flying columns," or as defined by a satiric German, "three Uhlans and a trumpet." This denial of all rights of self-defense against invasion was almost unanimously rejected by the other delegates, however; and the principle substituted that there must be actual occupation by adequate force, and lines of communication kept open; that it "exists only when the territory is placed actually under authority of the hostile army, extends only to the territory where such authority is established, and exists only so long as the belligerent is able to exercise it." The right of *levée en masse*, or armed insurrection of the body of a people, is linked with this; and naturally the states itching for conquest wished to confine belligerent rights to regularly enrolled armies, and oblige the rest of the people to submit when these are defeated. Of course no such rule adopted by the belligerents themselves would ever bind a people who wanted to rise, but it would form a plea for much political murder before it was repealed. Jomini said that war had so changed its nature in modern times that it was necessary to "regulate the inspirations of patriotism," for fear they might be "more disastrous to the country itself than to the oppressor"; and that "those grand explosions of patriotism which took place in the beginning of the century cannot continue to occur in our day, at least not in the same form." On this head it was proposed that any inhabitant of a country under occupation who should give information to the "enemy" (his own people) should be handed over to "justice." But this philanthropic repression of self-defense in its own interest, and outlawry of the means by which Prussia gained her own independence, was not agreed to. All these assaults on natural right were opposed by the British delegate. An attempt was made to discuss reprisals or retaliation, but it was refused. Restriction of bombardment of the interior of towns without harming the fortifications was sought, but flatly refused by Germany and Russia, on the ground that "experience had shown it (the bombardment) to be one of the most efficient means of securing the objects of a war," which is true of sack, massacre, and other things banned by civilization. Finally a proposal was made that, at the option of the belligerent, neutrals should be obliged to receive and care for (at the belligerent's expense) the wounded; in other words, that a strong power could make its neutral neighbors depots to keep its armies in condition.

2. The change in relations between gold and silver, which has produced so much financial and political demoralization in the last quarter century, was the subject of three international conferences within that time; at Paris, August 1878 and April 1881, and at Brussels, November 1892. The last named was called by President Harrison for both business and political reasons. The accumulation of silver under the Sherman

Act of 1890 was threatening the country with a fall to the single silver standard, only averted by the bond sales of 1893 and the repeal of the act; and the free-coinage movement which convulsed the country in 1896 was making headway, had been approved by the platform on which Harrison was elected, and demanded some recognition. Abroad, the recent adoption of the gold standard by state after state was raising gold to a premium, and arousing the fear that it was too scarce for the sole money of ultimate payment; the fall in silver was causing much loss and dislocation of trade, and many believed that its demonetization was the sole cause of this, and of the low price of commodities (which they called the high price of gold), and that its restoration by common agreement would raise its price again and restore equilibrium of commerce. The call was accepted by all the European states and Mexico, 20 with the United States; and all the 50 delegates were present, but those of Germany, Austria, and Russia were forbidden to debate or vote. The president was Montefiore Levi, of Belgium; vice-president Edwin H. Terrell, United States minister to Belgium. The United States delegation drew up the order of business, and offered a resolution that "it is desirable that some means should be found for increasing the use of silver in the currency systems of the nations," and, while stating their own belief in general bimetallism, suggested two plans short of this, to which Mr. Alfred Rothschild, of the British delegation, added a third. The resolution was favored by most of the delegations, who indeed would not otherwise have been sent there; but was too general to be of any service, and was laid on the table and not taken up. A special committee reported on the three schemes before it: (1) That of A. Soetbeer, too involved for international agreement; (2) Rothschild's, as altered in committee, essentially, that all Europe should buy 30,000,000 ounces of silver yearly, the United States to keep on buying 54,000,000; unlimited free coinage to be established in British India and Mexico; the agreement to run for five years unless silver rose to an agreed price before that; (3) Moritz Levy's, laid before the conference of 1881, to withdraw from circulation all gold coin and notes under 20 francs. The British delegation refused to support this unless joined with something like the Rothschild plan of maintaining the gold price of silver; the Latin Union members would not have this because it involved fresh purchases of silver; nor the United States, because of its unfairness to us; and Rothschild withdrew his plan. Thereupon the conference began discussing bimetalism till they adjourned, 15 December, for the holidays, to reconvene the following May if the governments thought it advisable; but the election of President Cleveland meantime had taken it out of the immediate political field as an adjunct, and it did not meet again.

Brussels Lace. See LACE.

Brussels Sprouts, a garden vegetable (*Brassica oleracea* var. *gemmifera*), derived from the same species as cabbage and cauliflower, like which it is cultivated as an autumn crop more widely in Europe than in America. Its enlarged axillary buds, an inch or more in diameter, are cooked like cabbage. The plants range from a foot to four feet high.

BRUT — BRUTUS

Brut, Roman de, a poem in eight-syllable verse, composed by Robert Wace, but indirectly modeled upon a legendary chronicle of Brittany, entitled 'Brut y Brenhinid' (Brutus of Brittany), discovered in Armorica by Walter, archdeacon of Oxford, and translated into Latin by Geoffrey of Monmouth. Wace presented his poem to Eleonore of Guyenne in 1155, and it was translated into Anglo-Saxon by Layamon.

The poem relates that after the capture of Troy by the Greeks, Æneas came to Italy with his son, Ascanius, and espoused Lavinia, daughter of King Latinus; she duly presented a son to him. This son, as well as Ascanius, succeeded to the throne, which devolved at last upon Silvius, son of Ascanius, who became the father of Brutus, from whom the 'Roman' takes its name. Brutus slew his father with a misdirected arrow, and fled. First he went to Greece, where he delivered the Trojan captives; next he conquered the Armorican Isles, to which he gave the name of Britain. Afterward he made war upon the king of Poitou and founded the city of Tours, which he named in honor of his son. From Poitou he returned to the Armorican Isles, overcoming the giants in possession, and renamed it Britain. He founded the city of London and reigned long and gloriously there.

The narrative now concerns itself with the descendants of Brutus. The adventures of Lear, of Belin, of Brennus who voyaged to Italy, of Cassivellaunus who so bravely resisted Cæsar, of all the bellicose chiefs who opposed the dominion of the Roman emperors, are minutely related. King Arthur, however, is the real hero of the 'Roman de Brut.' Arthur performs prodigies of valor, is the ideal knight of his order of the Round Table, and finally departs for some unknown region, where it is implied he becomes immortal, and never desists from the performance of deeds of valor. In this portion of the narrative figure the enchanter Merlin; the Holy Grail, or chalice in which were caught the last drops of the Saviour's blood as he was taken from the cross; Lancelot of the Lake; Tristan and his unhallowed love; Perceval and his quest of the Holy Grail. The 'Roman' became unprecedentedly popular, and it was publicly read at the court of the Norman kings.

Brütt, Ferdinand, German painter: b. Hamburg, 13 July 1849. He was educated at the Weimar art school and settled in Düsseldorf in 1876; was professor at the art school there in 1893; and in 1900 went to Cronberg. The subjects of his earlier pictures were from the life of the modern peasants or from the history of the 18th century, but in later years he has painted scenes from the life of the city. His works include: 'Peasant Delegation'; 'The Prince on the Promenade'; 'At the Exchange'; 'In the Art Gallery.'

Bruttii, an ancient people of Italy, living in the southwestern peninsula, now Calabria. The Greeks had several flourishing colonies on the coast and had to some extent conquered the inhabitants of the interior; the Lucanians also made themselves masters of some portions of the interior. But about 350 the people revolted, and, assisted by the Lucanians, gained their independence and captured several Greek cities. At this time they were called by the Greeks Bruttii (rebels). They remained independent till they

united with Pyrrhus against Rome and were subdued by the Romans in 272 B.C. In the second Punic war they sided with Hannibal, and after his expulsion from Italy were heavily punished by the Romans, robbed of considerable of their territory, entirely deprived of their independence, and not allowed to bear arms.

Brutus, or **Brute**, in the fabulous history of Britain, the first king of the island, according to Geoffrey of Monmouth. He is said to have been the son of Silvius, and grandson of Ascanius, the son of Æneas, and to have been born in Italy. He landed at Totness, in Devonshire, destroyed the giants who then inhabited Albion, and called the island from his own name. At his death the island was divided among his three sons: Lochrine had England, Cumber Wales, and Albanact Scotland.

Brutus, Decimus Junius, Roman soldier: d. 43 B.C. He served under Cæsar in the Gallic war, and in the civil war he commanded the fleet destined to besiege Massilia. Cæsar afterward appointed him to the government of further Gaul. Nevertheless he joined the conspiracy against Cæsar, and volunteered, on the memorable Ides of March, to conduct his friend and benefactor to the place of slaughter. When the tragedy was consummated, Decimus Brutus retired to Cisalpine Gaul, and there maintained himself for some time, but was ultimately deserted by his troops, betrayed to Antony, and put to death by order of that general.

Brutus, Lucius Junius, a Roman patriot, sometimes called the Elder, to distinguish him from Marcus Junius, the slayer of Cæsar, lived about 500 B.C. According to the legend, he was the son of Marcus Junius and the elder daughter of Tarquin the Proud, the last king of Rome, and is represented as having saved his life from the cruelty of that prince by feigning idiocy, whence he received the surname of Brutus (Stupid). Yet the king associated him with his own sons, Aruns and Titus, in a mission which he sent to Delphi to inquire into the meaning of a portent, which had caused much alarm at Rome. After receiving the reply to the question they were charged to propound, the young men enquired of the oracle which of the three should be king in Rome, no one of them being, it is observable, heir to that dignity. To this the reply was, "Whichever shall first kiss his mother." So, on their return to Italy, Titus and Aruns ran to kiss the queen mother; but Lucius Junius, as he landed from the galley, pretending to slip, fell prostrate and kissed the soil of Rome, in the belief that by "mother" the oracle had meant mother earth. When Lucretia, the wife of Collatinus, plunged a dagger into her bosom that she might not outlive the insult which she had suffered from Sextus, the son of Tarquin, Brutus is said to have drawn the dagger from the wound, and to have sworn vengeance against the Tarquins whose banishment he then demanded and procured. Then (about 509 B.C.) he is said to have been chosen one of the two first consuls. According to the legend, a conspiracy to restore the monarchy having been supported by the two sons of Brutus, he, after the crime had been proved, ordered the lictors to execute the law, and did not leave the assembly till after the execution. At length Tarquin marched against Rome. The consuls advanced to meet him. Brutus led the cavalry; Aruns,



WILLIAM JENNINGS BRYAN.

BRUTUS — BRYANT

son of Tarquin, commanded the body opposed to him. They pierced each other with their spears at the same moment, and both fell. The Romans conquered, and Brutus was buried with great splendor. The details of the story of Brutus, which may be regarded as a poetical legend, have been shown by Niebuhr to be irreconcilable with history.

Brutus, Marcus Junius, Roman republican: b. 85 B.C.; d. 42 B.C. He was the son of that Marcus Junius Brutus whom Pompey caused to be murdered, and of Servilia, the half sister of Cato. He lost his father when he was only eight years old, but his mother and uncles carefully directed his education. On the outbreak of the civil war he followed the example of Cato, and joined the Pompeians, notwithstanding his aversion to their leader. After the unfortunate battle of Pharsalia, he surrendered himself to Cæsar, who received him generously, allowed him to withdraw from the war, made him in the following year governor of Cisalpine Gaul, and afterward conferred on him the government of Macedonia. Notwithstanding these benefits, Brutus allowed himself to be drawn by Cassius and others into the conspiracy against Cæsar, who had now made himself master of the supreme power in the state. Cæsar was assassinated in the senate house. In public speeches Brutus explained the reasons of this deed, but he could not appease the dissatisfaction of the people, and retired with his party to the capitol. Antony succeeded in exciting the popular indignation against the murderers of Cæsar, and they were compelled to flee from Rome. Brutus went to Athens, raised a large force, and also gained over the troops in Macedonia. Thus, master of all Greece and Macedonia, he stood at the head of a powerful army. He went to Asia and joined Cassius, whose forces were also strong. At Philippi they fought the army of Antony and Octavius. Cassius was beaten by Antony, and caused himself to be killed. Brutus repulsed Octavius, by whom, however, he was soon afterward totally defeated. Seeing his cause ruined, he ended his life by falling upon his sword. Brutus was a man of little independent judgment, a mere student, liable to be swayed by others, and he was in no sense a martyr to a genuine patriotism. He was the author of philosophical and historical treatises, orations, etc., none of which now survive.

Bruyas, Jacques, zhāk brü-ya, French Jesuit: b. 1637; d. 1712. In 1666 on coming to Canada he went as a missionary to the Iroquois, and later established one of the earliest missions among the Mohawk Indians. He was a student of their language, and wrote in Latin a valuable work on the 'Mohawk Radicals.'

Bruyère, Jean de la, zhôn dè la brü yâr. See LA BRUYÈRE.

Brüyn, Barthel, bär'tël broin, German painter: b. Cologne, 1493; d. about 1556. His earlier works show the influence of some of the German masters, but later he imitated Michael Angelo and other Italian painters. His masterpiece is the altarpiece for the Church of St. Victor at Xanten. His numerous works are mostly in Cologne and Munich; among them are: 'Martyrdom of St. Ursula'; 'Adoration of the Magi'; 'Corpus Christi'; 'Saint Catherine'; and a number of portraits.

Bryan, Mary Edwards, American author: b. Jefferson County, Florida, 1844. Her father was Major John D. Edwards, and while a girl at school she married Mr. Bryan, a wealthy Louisianian. She began writing at an early age, and before the war was a regular contributor to the 'Southern Field and Fireside,' and other journals. After the war she edited the *Natchitoches, La., Semi-Weekly Times*, 'The Sunny South' (1874-84) at Atlanta, Ga., and in 1885 became editor of *The Fashion Bazaar* and *The Fireside Companion*, in New York. Of late years she has resided in Atlanta, and occupied herself with writing for the magazines. Her published books are: 'Manch' (1879); 'Wild Work' (1881), a story of Louisiana reconstruction; 'The Bayou Bride'; 'Kildee' (1886); 'Uncle Ned's White Child'; 'Ruth, an Outcast'; 'His Legal Wife'; 'The Girl He Bought'; 'My Own Sin'; 'His Wife's Friend.'

Bryan, William Jennings, American political leader: b. Salem, Ill., 19 March 1860. He was graduated at Illinois College, Jacksonville, in 1881, and at the Union College of Law, Chicago, in 1883. He practised law at Jacksonville from 1883 to 1887, when he removed to Lincoln, Neb. He was elected to Congress in 1890, and again in 1892. From 1894 to 1896 he was editor of the *Omaha World-Herald*. In 1896 he was nominated for President by the Democratic National Convention at Chicago, and also by the People's party and Free Silver Republicans, on a platform demanding the free and unlimited coinage of silver by the United States at a ratio of 16 to 1, regardless of the action of other nations, a financial policy which he had for some time advocated with much earnestness and eloquence of both tongue and pen. He was defeated at the polls by McKinley. During the war with Spain, he was colonel of a Nebraska regiment of volunteers, but saw no field service. In 1900 he was a presidential candidate, of the Democrats, Populists, and Free-Silver Republicans, upon an anti-imperialistic and anti-trust platform, with a reiterated demand for free-silver. He was again defeated by William McKinley. Soon after the election he established *The Commoner*, a political weekly. He wrote *The First Battle: a Story of the Campaign of 1896* (1896), which contains some of his speeches and a biographical sketch by his wife; besides he published numerous articles in periodicals.

Bryant, Henry Grier, American explorer and geographer: b. Allegheny City, Pa., 7 Nov. 1859. He graduated at Princeton, 1883, and from the law department of the University of Pennsylvania, 1886. He was secretary of the Edison Electric Light Company of Philadelphia, 1889-90, and has contributed literary articles to various magazines and encyclopædias. In 1891 he organized and conducted an exploring expedition to the Grand Falls of Labrador, was second in command of the Peary Relief Expedition in 1892, and in 1897 led an exploring expedition to the Mount Saint Elias region of Alaska. His services to the cause of geography have been recognized by his election to corresponding membership in societies in Europe and America. In 1895 and 1897 he was a delegate to international geographical congresses in London and Berlin.

BRYANT — BRYCE

Bryant, Jacob, English philologist and antiquary: b. Plymouth, 1715; d. 1804. He studied at Eton and King's College, Cambridge, became afterward tutor of the sons of the famous Duke of Marlborough, the eldest of whom he also accompanied to the Continent as his secretary. After his return he received, by the influence of his patron, a lucrative post in the ordnance, which gave him leisure for his researches into Biblical, Roman, and Grecian antiquities. His most important work is the 'New System of Ancient Mythology' (1774-6). He was engaged in a famous dispute on the veracity of Homer and the existence of Troy, in which he endeavored to show that there never was such a city as Troy, and that the whole expedition of the Greeks was a mere fiction of Homer. The object of one of his earlier treatises, which appeared in 1767, is to show that the island Melita, on which Saint Paul was wrecked, was not Malta, but situated in the Adriatic. He endeavored to illustrate the Scriptures by explanations drawn from Josephus, from Philo the Jew, and from Justin Martyr; but in this, as in all his writings, his learning and his ingenuity are misled by his love of controversy and paradox.

Bryant, John Howard, American poet: b. Cummington, Mass., 22 July 1807; d. Princeton, Ill., 14 Jan. 1902. He was a brother of William Cullen Bryant (q.v.). He studied at the Rensselaer Polytechnic Institute, Troy, N. Y., removed to Illinois in 1831, and from 1832 until his death lived on his farm at Princeton, performing the greater part of its work with his own hands. He held numerous local offices, served in the State legislature in 1842, and 1858; was a Free-soil candidate for Congress in 1854; and a delegate to the convention which organized the Republican party in 1856. He was an intimate friend of Abraham Lincoln, who appointed him collector of internal revenue for the Fifth Illinois district, 1862-6. The poems which were the product of his leisure hours show him as a lover of nature, which he described minutely and effectively, and a man of refined tastes and kindly feelings. His first printed poem, 'My Native Village,' appeared in the 'United States Review and Literary Gazette' in 1826, his brother William then being editor of that journal. His collected work may be found in 'Poems' (1855), and 'Poems Written from Youth to Old Age, 1824-84,' privately printed at Princeton, Ill., in 1885.

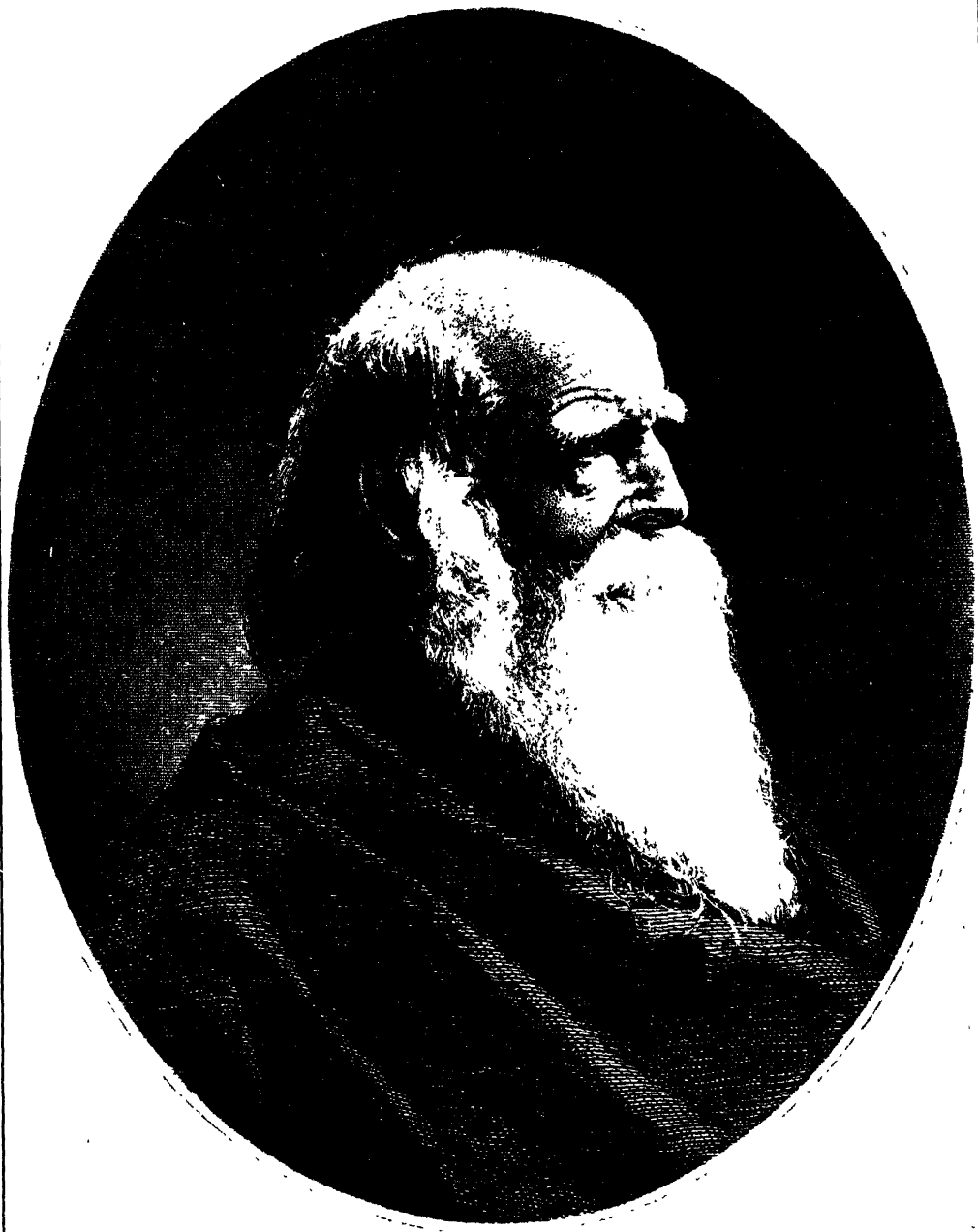
Bryant, Neil, American actor and minstrel performer: b. Keesville, N. Y., 1835; d. Brooklyn, N. Y., 6 March 1902. He was the youngest of three brothers, long prominent in the negro minstrel entertainment business. He made his first appearance on the minstrel stage in 1845, and soon became the champion American flute-player. With his brothers he opened a theatre at 472 Broadway, New York, in 1857, which they retained for 10 years. The oldest brother having died in 1867, the others continued in the same business in other locations in New York, but after the death of the second brother in 1875, Neil became unsuccessful and lost the most of what he had acquired. He retired from the stage in 1883 and was subsequently employed in the coast survey.

Bryant, William Cullen, American poet and journalist: b. Cummington, Mass., 3 Nov.

1794; d. New York, 12 June 1878. His father, Dr. Peter Bryant, a physician, was a man of much literary culture, as well as large experience in public affairs. He prepared, when he was but 14, a collection of poems, which were published in Boston in 1809. In that volume appeared 'The Embargo,' the only poem dealing with the politics of the day he ever wrote. In the following year Bryant entered Williams College as a student of law, but left without taking a degree in 1815, when he was admitted to the bar. In that year he became a contributor to the 'North American Review,' in which appeared the following year his 'Thanatopsis,' a poem in blank verse, which from the first has commanded profound admiration. Six years later he published a second collection of poems, which brought him into a wide fame. The principal piece, 'The Ages,' is a didactic poem, in which he sketches the past progress of the world, concluding with a glowing picture of America, and its occupation by the new race. He definitely abandoned law for literature in 1825, and went to New York, where he founded the 'New York Review,' and a year after became the editor of the *Evening Post*, an old established paper with which he was connected till his death. In 1832 he issued another collection of poems, which was republished in Great Britain with a preface by Washington Irving. In the summer of 1834, accompanied by his family, he went to Europe, and traveled through England, France, Germany, and Italy, remaining in the latter country for a considerable time. In 1845 he again visited Europe, and still again in 1849, when he extended his journey to Egypt and the Holy Land. The incidents of these and subsequent travels, both in Europe and America, were described in letters written to the *Evening Post*, which were reprinted in separate volumes, entitled 'Letters of a Traveler,' and 'Letters from Spain and Other Countries.' A complete edition of his poems up to 1855 was published in that year, and in 1863 appeared a small volume entitled 'Thirty Poems.' His last works of importance are his translations of the 'Iliad' (1870) and the 'Odyssey' (1872), translations which many American critics rank above any that had hitherto appeared in the English language. Early in 1878 appeared 'The Flood of Years,' his last poem of any great length, in which the poet, in strains that remind the reader of 'Thanatopsis,' reviews the life of man as the ridge of a wave ever hurrying on to oblivion the forms that appear on its surface but for a moment, concluding, however, with the expression of a confident hope in the future of mankind, even though the present is most dark and drear. At the time of his death he was engaged, in conjunction with Sydney Howard Gay, on a popular history of the United States, the first volume of which appeared in 1876.

Bryaxis, Greek sculptor: flourished in the 4th century B.C. He cast a statue in bronze of Seleucus, king of Syria, and assisted in adorning the mausoleum with bas-reliefs. He also executed five gigantic statues at Rhodes, a statue of Pasiphaë, and other works. According to Clemens Alexandrinus, two of his statues were attributed by some to the celebrated Phidias.

Bryce, George, Canadian clergyman and educator: b. Mount Pleasant, Ontario, 22 April 1844. He was graduated at the University of



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Toronto in 1867, and was ordained to the Presbyterian ministry in 1871. His great work was the foundation of Manitoba College and in assisting the foundation of Manitoba University. He has written: 'Manitoba, Its Infancy, Growth, and Present Condition' (1882); 'A Short History of the Canadian People' (1886); and 'Canada and the Northwest' (1887).

Bryce, James, British historian and politician: b. Belfast, 10 May 1838. His father, James Bryce, LL.D., was a Scotchman, well known as a distinguished teacher and geologist, and a master in the high school of Glasgow from 1846 to 1874. He received his early education at the high school and University of Glasgow, and latterly at Trinity College, Oxford, where he graduated B.A. with a double first-class in 1862, being in the same year elected a Fellow of Oriel College. In 1867 he became a barrister of Lincoln's Inn. From 1870 till his resignation in 1893, he was regius professor of civil law at Oxford. He entered Parliament in 1880 as member for the Tower Hamlets division of London, and since 1885 he has represented South Aberdeen as a Liberal and Home Ruler. He was chancellor of the duchy of Lancaster and a member of the cabinet in the Liberal ministry of 1892, and two years later he became president of the Board of Trade, a post which he held till the change of government ensuing upon the general election of 1895. He is D.C.L. of Oxford, LL.D. of Edinburgh and Glasgow; in 1894 he was elected a Fellow of the Royal Society, and many foreign honors have been conferred on him. His two most important works are: 'The Holy Roman Empire' (1864, afterward enlarged and republished), and 'The American Commonwealth' (1888), a very full exposition of the American Constitution, system of government, and administration, political machinery, etc. He has also written: 'Transcaucasia and Ararat' (1877); 'Impressions of South Africa' (1897); and 'Studies in History and Jurisprudence' (1901).

Bryce, Lloyd, American editor and novelist: b. Long Island, N. Y., 1852. From 1889 to 1896 he was editor of the 'North American Review.' His works include: 'Paradise'; 'A Dream of Conquest'; 'The Romance of An Alter Ego'; 'Friends in Exile.'

Bryden, Henry Anderson, English author: b. 3 May 1854. He was educated at Cheltenham College, and later studied for the bar. In early life he won a national reputation as an athlete, especially as runner. His travels in South Africa have been extensive. Among his books are: 'Kloof and Karroo: Sport, Legend, and Natural History in Cape Colony'; 'Gun and Camera in Southern Africa'; 'Tales of South Africa'; 'The Victorian Era in South Africa'; 'Nature and Sport in South Africa'; 'An Exiled Scot' (1899); 'Animals of Africa' (1900); 'From Veldt Camp Fires' (1900).

Brydges, Harold. See BRIDGE, JAMES HOWARD.

Brymner, Douglas, Canadian archivist: b. Greenock, Scotland, 1823. Trained for a mercantile career, he was engaged in business until 1856, when ill health compelled his retirement. He emigrated to Canada in 1857, and engaged in journalism, becoming editor of the Presbyterian and associate editor of the Montreal Herald.

In 1872 he was appointed historical archivist of Canada, and for 30 years labored tirelessly in collecting and arranging the historical records and documents of the Dominion. His series of annual reports, each entitled 'Report on the Canadian Archives,' constitute a rich treasury of original documents for every phase of Dominion history.

Bryn Mawr College, an educational institution for women, at Bryn Mawr, Pa.; founded in 1880 by Joseph Taylor. Its standard of admission is very high; its system of undergraduate studies combines required courses and varied elective groups. At the end of 1902 it reported: Professors and instructors, 38; students, 339; volumes in the library, 32,000; productive funds, \$1,000,000; income, \$131,000; benefactions, \$25,000.

Bryony (*Bryonia*), a genus of seven climbing perennial herbs of the natural order *Cucurbitaceæ*, natives of Europe and Asia. Common bryony (*B. dioica*), which attains a height of from 6 to 12 feet, has long, white, branching, ill-smelling, fleshy roots, one half inch thick; five-lobed roundish leaves; racemes of staminate flowers and axillary, greenish-white, pistillate, short-stemmed flowers in corymbs, followed by red berries as large as peas. Probably because of its repulsive odor the plant has been reputed as poisonous, but is used to some extent medicinally. The young shoots of this and the following species are often used like spinach. Common bryony is frequently planted for ornament in Europe, but like its relatives has not become very popular in the United States for this purpose. White bryony (*B. alba*) attains a height of from 6 to 12 feet, has thick, yellowish tuberculate roots, long-stemmed leaves and long-stemmed pistillate flowers in racemose corymbs. Abyssinian bryony (*B. abyssiniana*), which by some botanists is considered a species of the genus *Coccinia*, yields edible roots. Black bryony (*Tamus communis*), belongs to the natural order *Dioscoreaceæ*.

Bryophyllum, a small genus of succulent herbs of the natural order *Crassulaceæ*, natives of warm climates. *B. calycinum*, the only species cultivated in greenhouses, is a native of the Maluccas and Mexico. It is two to four feet high with reddish stems, fleshy leaves, and compound panicles of pendulous flowers. Both calyx and corolla are reddish green and cylindrical, the former about an inch long, the latter two inches or more. The plant is specially interesting since the leaves when laid on damp sand or moss or placed in moist air, produce new plants from the notches in their margins. In Bermuda, where they are called "floppers," in some of the West Indian islands, and parts of the southern United States, the plant is a weed in fence rows, upon stone walls, etc., and sometimes a pest in fields. Its leaves are said to be tart in the morning, tasteless at noon, and bitter in the evening, from the absorption of oxygen at night and its release in daylight.

Bryozoa, the name given by Ehrenberg to a class of mollusoid animals, the peculiarities of which have been previously observed by J. V. Thompson, who had called them polyzoa. See POLYZOA.

Brzesc Litewski, b-zětch li-těff'ski, or **Brest Litovskiy**, Russia, a fortified town in the government of Grodno, on the right bank of

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the river Bug, about 110 miles south of Grodno. It was formerly the capital of a Lithuanian palatinate, and contains an old castle, a high school, three churches, and a synagogue, and has a considerable transit trade. It is at the junction of railroads from Odessa to Königsberg and Moscow to Warsaw, and two fairs are held here annually. In 1794 Suwaroff gained here a victory over the Poles. Pop. (1897) 46,500.

Bua, boo'a, a small island in the Adriatic, belonging to the Dalmatian district of Spalatro, Austro-Hungary; is connected with the town of Trau by a bridge. During the latter period of the Roman empire many political offenders and heretics were confined here. It contains six villages, of which Santa Croce, or Bua, is the principal. The productions of the island comprise dates, wine, olives, and particularly asphaltum, of which there is a remarkable well.

Buache, Philippe, fê-lêp bü-âsh, French geographer: b. Paris, 7 Feb. 1700; d. 24 Jan. 1773. He spent seven years in arranging a new repository of maps and charts. In 1729 he became chief geographer to the king, and in the following year a member of the academy of sciences, in which he had been the means of instituting a professorship of geography. His notions of geography were in some respects peculiar. He asserted that there was a vast continent about the South Pole, traversed by lofty mountains and gigantic rivers. The suggestion, that at Bering Strait a connection between Asia and America might be traced, came from him. He published 'Considerations géographiques et Physiques sur les Nouvelles Découvertes au nord de la Grande Mer' (1753); 'Atlas Physique' (1754).

Buansuah, boo-an-soo', a wild dog (*Cyon primævus*), found throughout India, especially in the forests along the foothills of the Himalayan Mountains. It is smaller than a wolf, but similar in habits, and reddish in color. It hunts in companies, and a pack of these dogs is able to overcome any of the wild beasts in the jungle, except the elephant and rhinoceros, but they are very shy of mankind. It is generally known in the south as the dhole. See Dog.

Bubach. See INSECT POWDER.

Bu'balis or **Bubale**, a North African antelope (*Alcelaphus bubalinus*), thought to be the bubalus of the ancients. It is one of the hart-beests (q.v.), and equals a large stag in size, with an ox-like head and muzzle, and lyrate horn, heavily ringed. It is bay in color, with a black tuft on the end of the tail.

Bubas'tis, or **Bubastus**, a city of ancient Egypt, now in ruins; mentioned in the Old Testament as Pi-Beseth, now known as Tel-Basta; situated in the delta of the Nile, southwest of Tanis; was built in honor of the goddess Pasht, called by the Greeks Bubastis. This goddess was represented by the figure of a cat, and many mummied cats have been found in the tombs of Bubastis. On the north side of the city began the canal between the Nile and the Red Sea, constructed by Pharaoh Neco. Bubastis was taken by the Persians 352 B.C., and its walls dismantled. Among the ruins of this city have been found remains of costly and magnificent temples. Here were celebrated solemn feasts to the goddess Pasht,

attended by people from all parts of Egypt, even to the number of 700,000 at one time, as is stated by Herodotus.

Bubble Shell, the thin, inflated bubble-like shell of a gastropod mollusk (*Bulla*), the shell usually without a spire. On each side of the head is a large swimming flap (epipodium), and one species flits about in shallow pools on mud flats. Our eastern Atlantic coast species are *Bulla occidentalis* and *Hamina solitaria*, the latter found in Vineyard Sound. They mostly live in rather deep water, at least below low-tide mark.

Bubna und Littitz, boob'na, lit-titz', **Ferdinand** (COUNT OF), Austrian field marshal: b. Zamosk, Bohemia, 1768; d. Milan, 6 June 1825. He was early in life, the chamberlain of the emperor of Austria, afterward entered the military service, and after distinguishing himself on various occasions, at Mannheim, in the defense of Bohemia (1800), and at Austerlitz, gained at Wagram, in 1809, the rank of field-marshal-lieutenant. In the war of 1813 he commanded an Austrian division with much honor, was present at the battles of Lützen, Bautzen, Dresden, and Leipsic, and in 1814 received the chief command of the Austrian army which was to pass through Geneva to the south of France. He advanced upon Lyons, but was unsuccessful, till the corps of Bianchi and Hessen-Homburg came to his assistance. Bubna remained at Lyons till the return of the allied forces, and then retired to Vienna. After the landing of Napoleon in 1815, he again led a corps against Lyons, and in Savoy opposed Marshal Suchet, till Paris was conquered, and the marshal retreated beyond Lyons. He then took possession of Lyons without opposition, established a court-martial to punish the disturbers of public order, and proceeded with greater severity than on his former campaign. In September he marched back to Austria, and received for his services valuable estates in Bohemia from the emperor. In the insurrection of Piedmont, 1821, the Count de Bubna received the chief command of the Austrian troops destined to restore the ancient government. After the accomplishment of this commission, he was appointed general commandant of Lombardy.

Bu'bo, a genus of birds belonging to the family *Strigida*, or owls. They have a small ear aperture, two large feathered tufts like horns on the sides of the head, and the legs feathered to the toes. *B. maximus* is the eagle owl, or great owl. It is a native of Europe. The corresponding American species is *B. virginianus*.

Bubo, a hardening and enlargement of lymphatic glands, generally the inguinal, as in the Oriental or Levantine plague, syphiloid gonorrhœa, etc., always, unless dissipated by medical interference, followed by suppuration. In cases of true infecting syphilis a suppurating bubo is a rare complication, although induration of the glands in the later forms of the disease is almost invariably present. See BUBONIC PLAGUE.

Bubon'ic Plague, a disease supposed to be identical with the plague known as the Black Death, which had its origin in China, and made its first appearance in Europe 543 A.D., at Constantinople. It derives its modern name from the fact that it attacks the lymphatic glands in the neck, armpits, groins, and other parts of

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the body. The swollen parts are extremely sensitive to the touch, the patient suffers from headache, vertigo, high fever, vomiting, and great prostration. Another feature is the appearance of purple spots and a mottling of the skin. In severe cases death generally ensues in 48 hours, and, at best, recovery is slow. It is now generally agreed that this plague is a germ disease. The bacillus has been identified by Indian bacteriologists as well as by European and American investigators. It is found without trouble in the blood of the patient, and cultures are made in beef tea or glycerine preparations. The bacilli resemble those of chicken pox, and are said not to survive more than four days of dessications. At the Hoagland laboratory in Brooklyn, N. Y., extensive experiments have been made, both in the culture of the germs and in an anti-toxin, by means of which immunity from this scourge may be obtained. The disease has been called "the poor's plague," from the fact that it first attacked the half-starved masses who congregate in the slums of the cities. This was the case in Bombay, where so fatal were its ravages, that a panic ensued and more than 450,000 people, one half the population, left the city. Pure air, wholesome food, the free external use of cold water, and proper sanitary regulations modify to some extent the attacks of the plague, and, more than anything else, have been the cause of the comparative exemption of Europeans from it. It has, however, visited some of the cities of Europe.

History.—The first authentic description of the bubonic plague is contained in the writings of Rufus of Ephesus, who described the disease as having existed in northern Africa during the 3d or 4th century B.C. He presented the testimony of physicians of that period to corroborate his arguments. Since that time the disease has been variously described by writers under the name of Levantine, Oriental, and Bubonic Plague, and the black plague, or black death. These designations are more or less open to criticism and lack scientific foundation. In the reign of Justinian, 542 A.D., the disease appeared in Egypt, and within a year extended to Constantinople, where it is said to have caused the death of 10,000 persons in one day. In 1352 the plague spread through the whole of Europe and nearly one fourth of the population died. It is estimated by Hecker that during this reign of terror, out of 2,000,000 inhabitants of Norway, but 300,000 survived. It was estimated by Pope Clement VI. that the mortality from black death for the entire world was 40,000,000. This outbreak lasted about 20 years. During the great plague of London, in 1665, there were 63,596 deaths out of a population of 460,000. It was believed the infection was introduced by bales of merchandise from the Levant. The sanitary condition of London, at the time, was notoriously bad. It is a significant fact that those who lived out of town and on barges and ships on the Thames did not contract the disease.

Characteristics.—The bacillus of the bubonic plague was discovered and studied by Kitasato and Yersin, working independently, and at about the same time, in 1894, during the epidemic of the plague at Hong Kong. It is found in large numbers in the pus, in the lymphatic glands, and occasionally in the internal organs. It is apparently present in the blood only in the acute

hemorrhagic types of the disease, and shortly before death. An anti-plague serum injected into a young Chinaman at the Catholic mission at Canton in June 1896, who was attacked with a severe type of the disease, was effective. It is believed the plague is transmitted solely through infection from previous cases. What part, if any, the soil plays in propagating the disease has not been settled. The natives of Eastern countries are strongly impressed with the belief that the germ is contained in the ground. Exactly what influence the climate and temperature have in the propagation of the plague is not known. It is apparent, however, that hot, dry air is fatal to the disease, and that moist, warm air is favorable to it. It even may be very active in cold weather. This was shown by the outbreak that occurred on the Volga River, in Russia, in the severe winter of 1878. Like typhus fever, the plague is unknown in the tropics, and, like typhus, again, usually selects its victims from the lowest class, and thrives on filth and famine. The usual period of incubation is from three to six days. In the usual or severe forms, the earlier symptoms are similar to those that usher in typhus fever. The invasion is abrupt, associated with chills, great depression, blunted condition of the intellect, pains in the bones and high fever. Death frequently occurs within 48 hours, and even earlier. When life is prolonged for five or six days the prognosis is more favorable. The germ can be carried in rags, general merchandise and clothing. Rigid quarantine with disinfection of all articles should be strictly enforced when it appears in any country.

Remedies.—The chief causes of the plague are given as famine and filth. The various serums seem to be unavailable against these obstacles and even the use of antipyretics or stimulants. As a preventive serum, that of Prof. Haffkins has proven the most effectual. The compulsory evacuation of infected cities and districts has accomplished much. Indeed, this was the most available remedy during the epidemic in the Punjab district in 1896-7, and is the first preventive of a spread in case of an outbreak. The cities of India lie close to the river, the same being sacred, and the population multiplying upon their banks. As the river bottoms prevent proper drainage this militates largely in favor of the disease. The miserable "chawli," or huts, of the natives, squat low on the alluvial soil, which absorbs all drainage and gives out pestilential gases. The Hindu has little or no vitality to battle with the disease. His state of demoralization makes a livelihood impossible, and famine fosters the plague. The Mohammedans, unlike the Hindus, do not burn their dead bodies; nor like the Parsees, place them in the Towers of Silence, on Malabar Hill, to be eaten by the vultures. By burying in shallow graves, they aid the spread of the disease, contaminating all underground supplies of water.

Animals also spread the plague. Mice, rats, cats, and monkeys have been known to infect a ship and bring the scourge from a foreign port. Excessive precautions are taken at all ports leading from Asia, that of the Suez Canal being the most dangerous and carefully guarded highway into Europe. Every ship and, indeed, every passenger and piece of baggage is scrutinized, with a view to discovering the first symptoms of the plague in the victim or suspicious article of

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merchandise that may lead to infection. Precautions, however, are quite impossible in the incipient stages of the disease, as the evidences may not appear in the victim till he or she is already marked for death. Fever, swelling of the lymphatic glands, and utter prostration are soon superseded by the appearance of the bubos in groin, neck, and face, when death occurs in 90 cases out of a possible 100, within a period varying from five hours to as many weeks, depending upon the constitution of the victim. The white races are more immune than any other. The mode of life in civilized countries is conducive to successful battle with the plague. As it is rather sporadic than epidemic, even in the East, there should be little fear of its securing a foothold on western soil. Two cases of the disease were brought into New York harbor, 18 Nov. 1899, from Santos, Brazil, on the British steamship *J. W. Taylor*. The infected vessel was refused a landing, but was placed in quarantine and steps instantly taken to make sure and complete the isolation of the disease. Health Officer Doty, of New York, announced that the chances of the bubonic plague reaching this country through the ports of New York were extremely remote. Active measures were also taken in the summer of 1900 to disinfect the Chinese quarter of San Francisco in which the plague had appeared. In Honolulu heroic measures were adopted to stamp out the infection.

Bucaramanga, boo-ka-ra-măn'ga, the capital of the department of Santander, in Colombia, South America, 185 miles north-northeast of Bogota. It is an important coffee centre, and in the neighborhood are mines of gold, copper, and iron. A United States consul is resident here. Pop. 16,000.

Bucareli y Urzua, Antonio Maria, än-tō'-nē-ō mā-rē'a boo-cà-räl'ē ē ūrt-zoo'a, Spanish soldier and administrator: b. Seville, 24 Jan. 1717; d. Mexico City, 9 April 1779. He was governor of Cuba in 1760-71, and viceroy of New Spain (Mexico) from 1771 till his death.

Buccaneer, *The*, a narrative poem by Richard Henry Dana. It was first published in 1827, and the scene of a portion of the work is laid in Block Island, Rhode Island.

Buccaneers', a name applied to various bands of English and French freebooters in America, whose exploits form a remarkable part of the history of the 17th century. The origin of these associations of buccaneers seems to have been the arrogant pretensions of the Spaniards to the dominion of the whole of America. The English and French settlers combining against them for mutual defense, acquired from their precarious life in the vicinity of the Spanish settlements, adventurous and lawless habits, and became ultimately, in some of the islands of the Caribbean Sea, little better than pirates. The earliest association of this kind began about 1525, but they afterward assumed greater magnitude. After the assassination of Henry IV. in France in 1610, several Frenchmen sought a residence on the island of St. Christopher, one of the Antilles. Driven thence in 1630, some of them fled to the western coast of San Domingo, others to the small island of Tortugas, in the vicinity. Several Englishmen, led by a similar disposition, associated themselves with the latter. The fugitives at San Domingo employed

themselves especially in the chase of wild cattle, of which there were large herds on the island. They sold the hides to the mariners who landed on the coast, and as they cured the flesh by smoking it before the fire, like the American savages, they were called buccaneers, from the Caribbee *boucan*, a place for smoke-drying meat. These hunters lived in the rudest state of nature, enjoying in common all that they had taken in the chase or acquired by robbery. The Spaniards, who could not conquer them, determined to extirpate all the cattle on the island, and thus obliged the buccaneers either to cultivate the land as husbandmen, or to join the other freebooters on the island of Tortugas. These bold adventurers attacked, in small numbers and with small means, but with an intrepidity which bade defiance to danger, not only single merchant vessels, but several of them together, and sometimes armed ships. Their common mode of attack was by boarding. They directed their efforts especially against the Spanish ships which sailed for Europe laden with the treasures of America. By the repeated losses which they suffered, the Spaniards were at last so discouraged that they seldom offered a serious resistance. It happened once that a ship of the buccaneers fell in with two Spanish galleons, each of which had 60 cannon, and 1,500 men on board. To escape was impossible, and the pirates could not think of surrender. Their captain, Laurent, made a short speech to them, sent one of his men to the powder room with orders to set fire to it upon the first sign which he should give him, and then placed his men in order of battle on each side. "We must sail between the enemy's ships," cried he to his crew, "and fire upon them to the right and left." This manœuvre was executed with extraordinary rapidity. The fire of the pirate killed so many people on board both ships that the Spaniards were struck with a panic, and let him escape. The Spanish commander was afterward put to death on account of the disgrace which he had brought upon his nation. Their frequent losses greatly reduced the trade of the Spaniards with America. The buccaneers now began to land on the coast, and to plunder the cities. Their manner of dividing the booty was remarkable. Every one who had a share in the expedition swore that he had reserved nothing of the plunder. A false oath was of extremely rare occurrence, and was punished by banishment to an uninhabited island. The wounded first received their share, which was greater according to the severity of their wounds. The remainder was divided into equal parts, and distributed by lot. The leader received more than the others only when he had particularly distinguished himself. Those who had perished in the expedition were not forgotten. Their part was given to their relations or friends, and in default of them, to the poor and to the Church. Religion was strangely blended with their vices, and they began their enterprises with a prayer. The wealth acquired was spent in gambling and debauchery, for it was the principle of these adventurers to enjoy the present and not care for the future. The climate and their mode of life gradually diminished their number, and the vigorous measures of the British and French governments at last put an end to their outrages, which had, perhaps, been purposely tolerated. From this band of pirates arose the French set-

tlements on the western half of San Domingo. In the beginning of the 18th century the piracies of the buccaneers had entirely ceased. See Raynal, 'History of the Two Indies'; Burney, 'History of the Buccaneers'; Stockton, 'Buccaneers and Pirates of Our Coasts' (1898).

Buccari, book'ka-rē, or **Bakar**, an Austro-Hungarian free port on the Gulf of Quarnero, a few miles east of Fiume. It stands on the slope of a hill with a castle at the top, and its harbor, though small, is safe. Fishing, ship-building, and linen manufacturing are carried on here, the tunny fisheries being of the greatest importance. The wine of the district is also exported. Pop. (1890) 1,950.

Buc'cinator, the trumpeter's muscle, one of the maxillary group of muscles of the cheek. They are the active agents in mastication. The buccinator circumscribes the cavity of the mouth and, aided by the tongue, keeps the food under the pressure of the teeth; it also helps to shorten the pharynx from before backward, and thus assists in deglutition.

Buccin'idæ, a family of mollusks belonging to the order *Prosobranchiata*, and the section *Siphonostomata*. They constitute part of Cuvier's *buccinoida*. They have the shell notched in front, or with the canal abruptly reflected so as to produce a varix on the front of the shell. The leading genera are *buccinum terebra*, *eburna*, *nassa*, *purpura*, *cassisi*, *dolium*, *harpa*, and *oliva*. These shellfish are much valued as the source of the dye commonly called royal purple.

Buccinum, the typical genus of the family *Buccinidæ*. In English they are called whelks, which are not to be confounded with the periwinkle, also sometimes called whelk. *B. undatum* is the common whelk. Species of the genus exist in the cretaceous rocks, but it is essentially Tertiary and recent.

Bucpleugh, būk-klū', the title (now a dukedom) of one of the oldest families in Scotland, tracing descent from Sir Richard le Scott in the reign of Alexander III. (latter half of the 13th century), and first becoming conspicuous in the person of the border chieftain Sir Walter Scott, of Branxholm and Bucpleugh—the latter an estate in Selkirkshire. The son of Sir Walter, bearing the same name, was raised to the peerage, in 1606, as Lord Scott of Bucpleugh, and his successor was made an Earl in 1619. In 1663 the titles and estates devolved upon Anne, daughter of the second Earl, who married the Duke of Monmouth, illegitimate son of Charles II., the pair, in 1673, being created Duke and Duchess of Bucpleugh, etc. Subsequently the dukedom of Queensberry passed, by marriage, into the family. The sixth Duke of Bucpleugh, William Henry Walter Montagu Douglas-Scott, succeeded to the title in 1884.

Bucen'taur, a mythological being, half man and half ox or ass. The splendid galley in which the Doge of Venice annually sailed over the Adriatic on Ascension Day also bore this name. Dropping a ring into the sea, he espoused it in the name of the republic, with the words, "Desponsamus te, mare, in signum veri perpetuæ dominii." The custom originated in 1176, when the doge, having refused to deliver up the Pope, who had taken refuge in Ven-

ice, to the emperor, encountered and defeated the imperial fleet which was sent to reduce the Venetians.

Buceph'alus, the horse of Alexander the Great, which he bought for 13 talents (about \$5,000). Philonicus, a Thessalian, offered to sell him to King Philip; but Philip, who considered the price too great, commanded the unmanageable steed to be led away, when the young Alexander offered to mount him. He mounted accordingly, and to the astonishment of all, the horse obeyed him, and willingly submitted to his guidance, though he had never before obeyed a rider. Alexander, from this circumstance, conceived such an affection for him that he never rode upon any other horse; and Bucephalus also, when caparisoned for battle, suffered no other rider. He died of a wound, and Alexander caused him to be buried near the Hydaspes, and built over his grave a city, which he called Bucephala.

Bucer, bū'sér, or **Butzer**, **Martin**, German Protestant theologian: b. Schelestadt, Alsace, 11 Nov. 1491; d. Cambridge, 28 Feb. 1551. He entered the Dominican order in 1506, but in 1521 left the order, and became a convert to Lutheranism. He was at first preacher at the court of Frederick, the elector of the Palatinate, afterward in Strasburg, and at the same time professor in the university there for 20 years. He took part in the conference of Marburg with the hope of reconciling Luther and Zwinglius. In 1548 King Edward VI. of England, at the suggestion of Archbishop Cranmer, invited him to Cambridge, where he was professor of theology. In 1557 Queen Mary caused his bones to be burned. The Cardinal Contarini called him the most learned divine among the heretics. He wrote a commentary on the Psalms under the name of Aretius Filinus, and many other works. See Baur, 'Capito and Butzer' (1860); Tollin, 'Servet and Butzer' (1880); Mentz and Erichsen, 'Zur 400-jährigen Geburtsfeier Martin Butzer' (1891).

Buch, **Leopold von**, lä'ō-pöld fōn booh, German geologist: b. Stolpe, Prussia, 26 April 1774; d. Berlin, 4 March 1853. He studied under the celebrated Werner in the mining school of Freiberg in Saxony, where Alexander von Humboldt was his fellow-student, and early began to distinguish himself by his geological writings. His first works were Descriptions of the Mineralogy of Landeck, and of the Geognosy of Silesia. Up to 1798 he had adopted the Neptunian theory of Werner, with some modifications; but now saw cause to abandon it, and to recognize the volcanic origin of the basalts. He saw Vesuvius for the first time in 1799; but afterward, in 1805, had an opportunity, along with Humboldt and Gay Lussac, of witnessing its actual eruption. In 1802 he examined the extinct volcanoes of Auvergne in the south of France. The results of all these geological travels were given to the world in a work entitled 'Observations During Travels in Germany and Italy' (1802-9). Indefatigable as an observer, Von Buch turned his steps from the south of France in 1806, and proceeding to Scandinavia spent two years in examining its physical constitution. This furnished the materials for his well-known work entitled 'Travels in Norway and Lanland.' In 1815 he visited the Canary Isles. These volcanic isles furnished

the starting point from which Von Buch commenced a regular course of study on the production and activity of volcanoes. This is attested by his standard work on the subject, entitled 'Physical Description of the Canary Isles' (1825). On his return from the Canaries he visited the basaltic group of the Hebrides and the coasts of Scotland and Ireland. His geological excursions, even in countries which he had repeatedly visited before, continued without interruption at a very advanced age, till within a few months of his death. Alexander von Humboldt, who had known him intimately for a period of more than 60 years, called him the greatest geologist of our period. He was unmarried, and lived aloof from the world, entirely devoted to scientific pursuits. Besides the works already mentioned he was the author of many important tracts on paleontology, as, 'On the Ammonites' (1832); 'On the Terebratulæ' (1834); 'On the Ceratites' (1841); and 'On the Cystidæ' (1845). Another of his works not to be omitted is his 'Geological Map of Germany.'

Buchan, bük'an, Alexander, Scottish meteorologist: b. Kinnesswood, Kinross-shire, Scotland, 11 April 1829. He was a teacher in Edinburgh, 1848-60, becoming in the latter year secretary to the Scottish Meteorological Society and in 1878 curator of the library and museum of the Royal Society of Edinburgh. He has published 'A Handy Book of Meteorology' (1867); 'Introductory Text-Book of Meteorology' (1871). He contributed to the *Encyclopædia Britannica*, 9th edition, the article on 'Meteorology.'

Buchan, David, English voyager and explorer: b. 1780; d. about 1837. He obtained a lieutenant's commission in the navy in 1806, and in 1810 his admiral, Sir John Duckworth, dispatched him to the river Exploits, for the purpose of exploring the interior and opening a communication with the natives. He reached the mouth of the river in January 1811, and with 34 men and 3 guides penetrated through the greatest difficulties 130 miles into the country. Buchan afterward became high sheriff of Newfoundland. On a subsequent expedition he was lost with his ship Upton Castle. In 1818 Buchan was appointed to the command of an Arctic expedition. The admiralty fitted out two expeditions that year—one to discover the northwest passage, the other to reach the North Pole. The *Dorothea* and *Trent* were the vessels selected for the second expedition, under Capt. Buchan and Lieut. (afterward Sir John) Franklin. Latitude 80° 34' N. was the most northerly point gained by this expedition.

Buchan, John, Scottish novelist: b. Perth, Scotland, 26 Aug. 1875. He was educated at Glasgow University and Brasenose College, Oxford. His published books include 'Sir Quixote' (1895); 'Musa Piscatrix' (1896); 'Scholar Gipsies' (1896); 'Sir Walter Raleigh' (1897); 'John Burnet of Barns' (1898); 'A History of Brasenose College' (1898); 'Grey Weather' (1899); 'A Lost Lady of Old Years' (1899); 'The Half-hearted' (1900); 'The Watcher by the Threshold' (1902).

Buchan, Elspeth (SIMPSON), Scottish religious enthusiast, founder of a sect: b. near Banff, 1738; d. near Dumfries, 1791. She was educated in the Scottish Episcopal Church, but

on her marriage to Robert Buchan, in Glasgow, became, like him, a burgher seceder. In 1779, or thereabout, she broached dogmas of her own, soon deserted her husband and moved to Irvine, where she made a number of converts, among them Mr. Hugh Whyte, a relief clergyman. In 1784, the people assaulted Mr. Whyte's house, which the Buchanites had made their tabernacle. They then, 46 persons in all, set up a sort of community at a farm-house 13 miles from Dumfries, waiting for the millennium or the day of judgment, fasting for weeks in the expectation that they would be fed like the young ravens that cry, and adjuring all fleshly vanities. A few left, accusing Mrs. Buchan of tyranny and dishonesty, but the majority of her votaries were faithful to her to the last. She called her disciples around her death-bed and communicated to them, as a secret, that she was the Virgin Mary, who had been wandering through the world since the Saviour's death, and that she was only going to sleep now, and would soon conduct them to the new Jerusalem. Her disciples, in the expectation of her re-appearance, refused to bury her until ordered by a justice of the peace. The sect became extinct in 1848. See BUCHANITES.

Buchan, William, Scottish physician: b. Ancrum, Roxburghshire, 1729; d. 1805. He commenced practice at Edinburgh, and having for a considerable time directed his attention to a digest of popular medical knowledge, published in 1769 his work entitled 'Domestic Medicine; or, the Family Physician,'—an attempt to render the medical art more generally useful by showing people what is in their own power, both with respect to the prevention and cure of diseases. It is constructed on a plan similar to that adopted by Tissot in his 'Avis au Peuple.' It appealed to the wants and wishes of so large a class of the community, that, considering it to have been the first work of the kind published in Britain, there is no wonder that it should have attained success. Before the death of the author 19 large editions had been sold. Duplanl of Paris, physician to the Count d'Artois (Charles X.), published a translation in five volumes, with notes, which rendered the work so popular on the Continent that in a short time no language in Christendom wanted its translation. It would almost appear that the work met with more undivided applause on the Continent than in Britain. While many English and Scottish physicians conceived that it was as apt to generate as to cure or prevent diseases, by inspiring the minds of readers with hypochondriacal notions, those of other countries entertained no such suspicions. Among the testimonies of approbation which Dr. Buchan received from abroad was a huge gold medalion, sent by the Empress Catherine of Russia, with a complimentary letter. The work became more popular in America and the West Indies than in the older hemisphere. Buchan published two other works: 'A Treatise on Gonorrhœa'; 'An Advice to Mothers on the Subject of their own Health, and on the Means of Promoting the Health, Strength, and Beauty of Their Offspring.' He was buried in Westminster Abbey.

Buchanan, bū-kän'an, Andrews Hays, American educator: b. Washington County, Ark., 28 June 1828. He was graduated at Cum-

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berland University in 1853; and took a special course in civil engineering and mathematics in Lincoln University; taught civil engineering in 1854-61; was military topographical engineer in the Confederate army during the Civil War; and became professor of mathematics and civil engineering in Cumberland University in 1869. He was employed by the superintendent of the United States Coast and Geodetic Survey to take charge of the triangulation of Tennessee, on which work he was engaged for four months in every year from 1876 to 1896. He was the author of 'Plane and Spherical Trigonometry'; etc.

Buchanan, Claudius, Scottish missionary clergyman: b. Cambuslang, Scotland, 1766; d. 1815. He took orders in the Church of England, and was appointed chaplain to the East India Company in 1795. From this time the remainder of his life was occupied in missionary labors in India, and in forwarding the translation of the Bible into the Indian languages. In 1800 he was appointed professor of Greek, Latin, and English in the College of Fort William. He returned to Europe in 1808, afterward visited the Holy Land, and was engaged at his death in a translation of the New Testament into Syriac. He published 'Christian Researches in Asia, with a Notice of the Translation of the Scriptures into the Oriental Languages' (1811), and several other works.

Buchanan, Francis, Scottish traveler: b. Stirlingshire, 15 Feb. 1762; d. 1829. He traveled extensively in the East Indies, making collections illustrative of the botany, zoology, etc., of the countries which he visited, and published 'A Journey from Madras Through the Countries of the Mysore, Canara, and Malabar, Performed Under the Orders of the Marquis Wellesley for the Purpose of Investigating the State of Agriculture, Arts, and Commerce, etc., History, Antiquities, etc., in the Dominions of the Rajah of Mysore' (1807). He contributed largely to the scientific journals of the day, and in 1819 published a 'History of the Kingdom of Nepal,' and in the same year a 'Genealogy of the Hindu Gods,' which he had drawn up some years before with the assistance of an intelligent Brahmin. In 1822 appeared his 'Account of the Fishes of the Ganges,' with plates.

Buchanan, Franklin, American naval officer: b. Baltimore, 17 Sept. 1800; d. Talbot County, Md., 11 May 1874. At an early age he entered the navy, becoming lieutenant in 1825 and master-commandant in 1841. The organization of the United States Naval Academy was committed to him in 1845 and he was made the first superintendent. During the Mexican war he took part in the siege of Vera Cruz. In Commodore Perry's expedition to Japan he had command of the flagship. In 1855 he was raised to the rank of captain, and in 1861 resigned from the United States navy, intending to follow his State in secession, but later asked to be restored. Upon the refusal of his request, he entered the Confederate navy. In command of the *Merri-mac* in Hampton Roads, he sank the Congress and the Cumberland, being severely wounded during the engagement. After promotion to the rank of admiral in the Confederate navy he commanded at the battle of Mobile Bay, where he was defeated by Farragut, lost a leg, and was made prisoner. At the close of the War he be-

came president of the Agricultural College of Maryland.

Buchanan, George, Scottish reformer and Latin poet: b. Killearn, Stirlingshire, February 1506; d. Edinburgh, 28 Sept. 1582. He was sent, in 1520, when 15 years of age, to prosecute his studies in the University of Paris. In 1523 he joined the auxiliaries brought over from France by Albany, then regent of Scotland, and served as a private soldier in one campaign against the English. In the ensuing spring he was sent to the University of St. Andrews as a pauper student, and took his degree in 1525. In 1630 he was elected a professor in the College of St. Barbe, in Paris, where he taught grammar three years. Soon after he attracted the notice of Gilbert Kennedy, Earl of Cassillis, then studying in Paris; and at the end of three years he was engaged to devote his time entirely to the care of the young Earl's education. With this nobleman he resided as a preceptor for five years, and to him he inscribed his first published work, a translation of Linacre's 'Rudiments of Latin Grammar,' printed in 1533.

In 1536 James V., having married Magdalene, daughter of Francis I., returned to Scotland in May, bringing with him Cassillis and George Buchanan. The connection between Buchanan and the Earl seems not to have been immediately dissolved; for it was while residing at the house of his pupil that the poet composed 'Somnium or the Dream,' apparently an imitation of a poem of Dunbar's, entitled 'How Dunbar was Desyred to be ane Frier,' and a bitter satire upon the impudence and hypocrisy of the Franciscans. This piece of railery excited the utmost hostility on the part of its objects, and to avoid their vengeance Buchanan had determined to retire to Paris. James V., however, took him under his protection, and retained him as preceptor to his natural son, James Stuart. Buchanan afterward wrote his 'Palinodia' in two parts, a covert satire, which wounded the ecclesiastics still more painfully than its predecessor; and his 'Franciscanus,' one of the most pungent satires to be found in any language. The Catholic clergy being still dominant in Scotland, Buchanan fled to England, and afterward to France. He was invited to Bordeaux by Andrea Govea, a Portuguese, principal of the College of Guienne, lately founded in that city, through whose interest he was appointed professor of humanity in that afterward highly famed seminary. Here Buchanan remained for three years, during which he completed four tragedies, besides composing a number of poems on miscellaneous subjects. Among his pupils at Bordeaux Buchanan numbered the celebrated Michel de Montaigne, who was an actor in every one of his dramas; and among his friends were not only his fellow-professors, but all the men of literature and science in the city and surrounding country. One of the most illustrious of these was the elder Scaliger, who resided and practised as a physician at Agen. In 1544 we find him in Paris as one of the regents in the college of Cardinal le Moine, which position he seems to have held till 1547.

In the year 1547 Buchanan passed into Portugal along with Govea, who was recalled by King John III. to take the superintendence of the newly founded University of Coimbra.

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Govea, however, died in less than a twelve-month, and Buchanan soon found himself exposed to the jealousy of the priests. The Inquisition took him under its cognizance, and sentenced him to be confined in a monastery that he might by the inmates be instructed in the principles and practice of religion. Here he consoled himself by planning and in part executing his unrivaled paraphrase in Latin verse of the Psalms of David. The probability is that the poor monks were incapable of appreciating his labors; but he seems to have gained their good will, for he was restored to his liberty, and obtained the king's permission to return to France. Immediately on his arrival in Paris he was appointed to a regency in the College of Boncourt. In this station he remained till 1555, when he was engaged by the celebrated Comte de Brissac to act as domestic tutor to his son, Timoleon de Cossé. During the five years of his connection with this illustrious family, Buchanan's residence was alternately in France and Italy, and as his pupil was destined to the profession of arms, and had different masters to attend him, he found leisure for prosecuting his poetical studies, and formed the design and composed part of his philosophical poem, 'De Sphæra,' which he addressed to his pupil. At this time there was published the first specimen of his version of the Psalms, and his translation of the *Alcestis* of Euripides. His ode on the surrender of Calais was also composed while in Brissac's family. But much of his spare time was employed in examining the grounds of his religious belief, and settling to his own satisfaction the great question between the Roman Catholic and the Reformed Church. He had all along inclined to the side of the Reformed; but he had not yet relinquished his connection with the ancient Church.

As Buchanan's connection with the Marshal de Brissac terminated in 1560 he probably returned immediately to Scotland. He had courted the notice of Mary, future queen of Scots, by an 'Epithalamium' on her marriage with the dauphin; and we find Randolph, the English ambassador, writing thus from Edinburgh to his employers: "Ther is with the queene (Mary) one called George Bowhanan, a Scottishe man very well learned, that was Schollemaster unto Monsr. de Brissack's son, very Godlye and honest." And in a subsequent letter, dated from St. Andrews, he says: "The queene readeth daylie after her dinner, instructed by a learned man, Mr. George Bowhanan, somewhat of Livy." Buchanan took occasion to express his attachment to his royal pupil in a highly finished copy of Latin verses prefixed to his translation of the Psalms, which he had just finished. Mary, in return for this compliment, and as a reward for his services, bestowed upon her preceptor and poet, in 1564, the temporalities of the Abbey of Crossraguel, which he held till the day of his death. Buchanan, however, sedulously cultivated the friendship of the leaders of the Reformation. In 1564 he prepared for the press a collection of pieces, entitled 'Fratres Fraterrimi,' in which the monks and other ecclesiastics were assailed with the keenest irony and the most vehement invective. He also put the finishing hand to his 'Franciscanus,' published with a dedication to the Earl of Moray. Through the interest of this nobleman Buchanan was nomi-

nated to be principal of St. Leonard's College, St. Andrews, in 1566. Next year he was chosen moderator of the General Assembly, the only instance of the chair being held by a layman.

When Elizabeth thought fit to appoint commissioners, and call witnesses from Scotland, for the purpose of substantiating the charges upon which Mary had been expelled from the throne, the main burden of the proof was devolved upon Buchanan. He accompanied the Regent Moray into England upon that occasion, and it appears impossible to absolve him from the charge of being a willing assistant in Moray's unfair procedure against Mary. Some even accuse him of forging the celebrated Casket Letters. In 1571 he published in Latin a 'Detection of Mary's Actions,' based on the Book of Articles which Moray presented at the conference. The assassination of the Regent Moray, soon after his return from England, threw the nation into a ferment, and Buchanan, strongly suspicious of the selfish policy of the Hamiltons, addressed 'Ane Admonition Direct to the Trew Lordis Maintenanis of Justice and Obedience to the Kingis Grace,' in which he earnestly adjured them to protect the young king and the children of the late regent from the perils that seemed to impend over them. The same year he composed a satirical delineation of the character of the Secretary Lethington, entitled 'Chamelcon,' which, through the vigilance of the secretary, was prevented from being published at the time. A copy, however, was preserved among the Cotton MSS., dated 1570, and it was printed at London in 1710, in the 'Miscellanea Scotica.' It has often been reprinted since. These two pieces appear to be all that he ever composed in his vernacular tongue, and they are of such excellence as to make it matter of regret that he did not turn his attention oftener to the cultivation of his native language. Buchanan was, in 1570, selected by the lords of the privy council to take the superintendence of the education of King James; and the respectable scholarship which his pupil exhibited in after life shows that he executed his task with success. The same year he was made keeper of the privy seal. It was principally by his advice and that of Sir Alexander Erskine that Morton was deposed, and the reins of government put into the king's hands when he was only in his 12th year. He was a member of the privy council appointed for the young monarch, but seems to have been displaced on Morton's return to power. In 1576 he prepared his 'Baptistes,' and dedicated it to the young king, with a freedom of sentiment bordering upon disrespect. In 1579 he published his compendium of political philosophy, entitled 'De Jure Regni apud Scotos,' a work which will ever rank him among the spirited defenders of the rights of the people to judge of and control the conduct of their governors. He also compiled his life at the request of his friends, when he had reached his 74th year, and his epistolary correspondence, which was at one time very extensive, was still continued with some of the friends of his earlier days.

It is doubtful whether he lived to see his 'History of Scotland' ushered fairly into the world or not. The dedication to the king is dated 29 Aug. 1582, only 30 days before the death of the author. Notwithstanding the many public situations he held in his lifetime, such



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was the extent of his charities, that he died poor, and was buried at the expense of the city of Edinburgh, in the Gray Friars Churchyard, a great multitude attending his funeral. In 1584, two years after its publication, the history was condemned, along with 'De Jure Regni,' by the parliament of Scotland, and every person possessed of copies commanded to surrender them within 40 days, in order that they might be purged of the offensive and extraordinary matters which they contained.

Buchanan during his life was a violent and often virulent partisan; and his character, therefore, has been differently estimated according to the political and religious views of the writers. As a Latin poet and historian, however, there can be but one opinion of his excellence. In the former department no modern Latinist has approached him in harmony and splendor of diction; in the latter department he is said to unite the beauties of Livy and Sallust as to style. Perhaps, after all, it is as a political writer that the world is chiefly indebted to him, for he was among the first to combat the old axiom of the "divine right of kings," and to expound the true rights and privileges of the subject. Of his works there are two collective editions, Ruddiman (1715), and Burmann (1725). See Irving, 'Life' (1817).

Buchanan, George, Scottish surgeon: b. Glasgow, 1827. He became surgeon of the Western Infirmary of Glasgow and later served as civil surgeon with the British army in the Crimean war. In 1888 he was elected president of the surgical section of the British Medical Association, and in 1900 was appointed professor of clinical surgery in the Glasgow University. He was the author of 'Camp Life in the Crimea'; 'On Lithotripsy, with Cases'; 'Clinical Surgery'; 'Radical Cure of Inguinal Hernia in Children'; 'Talipes Varus'; 'Faure's Storage Battery and Electricity in Surgery'; and 'Anæsthesia Jubilee, a Retrospect.' He was one of the editors of the 'Glasgow Medical Journal,' and also edited the 10th edition of the 'Anatomist's Vade Mecum.'

Buchanan, James, fifteenth President of the United States: b. Stony Batter, Franklin County, Pa., 22 April 1791; d. Lancaster, Pa., 1 June 1868. His father was by birth an Irishman, who had quitted Europe in 1783, and established himself on a farm at Stony Batter. The son was educated at Dickinson College, Carlisle, where he graduated. He subsequently entered the office of James Hopkins of Lancaster to study law, and was admitted to the bar in 1812. Although holding Federalist opinions at this time he supported the War of 1812. In 1814 he was elected to the legislature of Pennsylvania, and in 1820 was sent to Congress, of which he continued a member till 1831, being re-elected four times. He then entered upon a career of diplomacy, being charged by President Jackson with a special mission to Russia for the conclusion of a commercial treaty. On his return, in 1833, he was elected to the Senate. About this time the anti-slavery agitation began to assume importance. Buchanan wished to prevent the agitation reaching Congress, by declaring its incompetency to deal with it. He held that constitutionally it was a question for the individual States, and that it was better for all parties, even for the slaves themselves, that

it should remain so. Under the presidency of Polk, 1845-9, Buchanan was intrusted with the functions of secretary of state. The annexation of Texas and the war with Mexico were the chief events of his administration. During the presidency of Gen. Taylor he retired from public life. In 1853 Gen. Pierce, on being elected President, named him ambassador of the United States at London. He held this appointment till 1856. The Central American boundary and the project of the annexation of Cuba were the principal subjects discussed during his embassy. With Mason and Soulé he signed the Ostend manifesto which recommended the acquisition of Cuba. While maintaining with ability the views of his own country, he gained the esteem of that to which he was deputed by the prudence and moderate tone of his diplomacy. He returned to America in 1856, being chosen as candidate for the presidency by the Democratic party. He was elected by a large majority over Fremont, the Republican candidate, and inaugurated in March 1857. His foreign policy inclined to the aggressive views he had always advocated, but the questions of slavery and State-rights were at this period approaching a crisis which made home administration of much greater importance. As President he deferred constantly to pro-slavery leaders and was unduly influenced by their threats of secession. His character for statesmanship suffered greatly from his vacillation in dealing with the first measures of the seceders; but it must be considered that the position of a ruler holding office as the *locum tenens* of his successor is not favorable to a vigorous administration in a difficult crisis. He took up the position that while the States had no right to secede, the nation had no power to prevent their doing so. He supported the administration of Lincoln, and lent his influence to the vigorous prosecution of the War, declaring that the North would sustain the administration almost to a man, and that it ought to be sustained at all hazards. Consult his own defense of his course, 'Mr. Buchanan's Administration on the Eve of the Rebellion' (1866); Curtis, 'Life of James Buchanan' (1883).

Buchanan, Robert Christie, American soldier: b. Baltimore, about 1811; d. Washington, 29 Nov. 1878. He graduated at the United States Military Academy in 1830, and served in the Black Hawk war in the rank of second lieutenant. From 1837-8 he served in the Seminole war, and from 1845-6 in the military occupation of Texas. During the Mexican war he was promoted for gallantry. In 1856 he was placed in command of the military district of Oregon and northern California. Early in the Civil War he was promoted lieutenant-colonel. He fought in the Peninsular campaign, and on the Rappahannock, winning at Gaines Mills the rank of brevet-colonel, and at Malvern Hill that of brevet-brigadier-general. He was in the battles of Antietam and Fredericksburg, and was promoted brevet-major-general. In 1864 he was assistant provost-marshal for New York. In 1870 he retired from active service.

Buchanan, Robert Williams, English poet and novelist: b. Caverswall, Staffordshire, 18 Aug. 1841; d. London, 10 June 1901. He received his education in Glasgow, and while young went to London to engage in literature.

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His attack upon Dante Gabriel Rossetti, 'The Fleshly School of Poetry,' drew a famous letter from that poet on 'The Stealthy School of Criticism,' and a scathing pamphlet from Swinburne, 'Under the Microscope' (1872). It should be added that in later life he regretted his course in this matter. His poems include 'Undertones' (1863); 'Idylls and Legends of Inverburn' (1865); 'London Poems,' his best effort (1866); 'North Coast Poems' (1867); 'Book of Orm, the Celt' (1868); 'St. Abe and His Seven Wives' (1871); 'Napoleon Fallen: a Lyrical Drama' (1871); 'The Drama of Kings' (1871); 'Ballads of Love, Life and Humor' (1882); 'The City of Dreams' (1888); 'White Rose and Red'; 'The Wandering Jew' (1893). His best novels are 'The Shadow of the Sword' (1876); 'A Child of Nature' (1879); 'God and the Man' (1881); 'The Martyrdom of Madeline' (1882); and 'Foxglove Manor' (1884). Buchanan also wrote successful plays, among which are 'A Man's Shadow' (1890); 'Dick Sheridan' (1894). He was aggressive by temperament, and his naturally keen critical sense was much warped by intolerance.

Buchana'nia, a genus of *anacardiaca*, named after Dr. Buchanan Hamilton, a well-known Indian botanist. *B. latifolia* is a large Indian tree, the kernel of the nut of which is much used in native confectionery. It abounds in a bland oil. A black varnish is made from the fruits. The unripe fruits of *B. lancifolia* are eaten by the natives of India in their curries.

Buchanites, bŭk'ăn-īts, a sect of enthusiasts who sprung up at Irvine, in the west of Scotland, about 1783. Rev. Hugh White, the minister of a congregation of the Relief Church in that town, having been invited to preach in the neighborhood of Glasgow, Elizabeth Buchan, the wife of a painter, was captivated with his eloquence, and writing to him, announced that he was the first who had spoken to her heart, and requested permission to pay him a visit at Irvine, that the work of her conversion might be perfected. On her arrival she was joyfully received by the members of the congregation, engaged without intermission in religious exercises, went from house to house, conducted family worship, answered questions, resolved doubts, explained the Scriptures, and testified that the end of the world was at hand, and that it was the duty of every Christian to abandon the concerns of time and prepare for the reception of Christ. White was complained of to the presbytery, by which he was deposed from his ministry. Thus a distinct party was formed, the meetings of which were commonly held at night, and on these occasions the new prophetess indulged in her reveries, styling herself the Woman of the Twelfth of Revelations, and White her first-born. Such gross outrage on the common sense of the inhabitants occasioned a popular tumult, to save her from the fury of which the magistrate sent her under escort to some distance; after which, with her clerical friend, and about 40 deluded followers, she wandered up and down the country, singing, and avowing that they were travelers for the New Jerusalem, and the expectants of the immediate coming of Christ. They had a common fund, and did not consider it necessary to work, as they believed God would not suffer them to want. See BUCHAN, ELSPEETH.

Bucharest, boo-ka-rĕst', or **Bukarest** (Rumanian, *Bucuresci*, that is, "city of joy"), formerly the chief city of Walachia, now the capital of the kingdom of Rumania, on the Dimbovitza, 37 miles from its mouth. It is the most populous city of southeastern Europe after Constantinople and Budapest, and is spoken of by the Rumanians as the Paris of the East. Besides being the seat of government, Bucharest is the residence of a Greek archbishop. The houses are mostly of one story, built of brick, pointed externally, and have metal roofs. The streets are mostly narrow and crooked, the most important being the Boulevard, running from east to west, the Calea Victoriei, the Lipscani, and the Karlstrasse. There are statues to Joan Heliade-Radulescu, the father of Rumanian literature; George Lazar; and others. Twelve bridges, five of iron, and seven of stone, cross the Dimbovitza, a small, muddy stream that formerly caused a good deal of damage by inundations. From 1885 till 1896 extensive fortifications were erected, there being now 18 forts in the circle of defense. The inhabitants nearly all belong to the Greek Church. The churches are very numerous, but few of them are architecturally noteworthy; the chief being the metropolitan cathedral, built in 1656, restored in 1834, and standing on a hill, and the Roman Catholic cathedral, built in 1875-84, one of the chief ornaments of the city. Bucharest has a university, and connected with it a public library and a museum of natural history and antiquities. There are four lyceums, two gymnasias, some technical and military schools, a conservatory of music, girls' schools, and other educational institutions. There are a few fine public buildings, of which the most conspicuous is the royal palace, recently rebuilt; among the others being the new Palace of Justice, the National Theatre, the atheneum, the post-office, and several fine hotels. What chiefly distinguishes Bucharest is the magnificence of the public gardens. There is a mixture in the population of eastern habits, with European civilization among the upper classes. The manufactures comprise iron goods, earthenware, leather, linen, soap, paper, beer, etc., but they are of no great importance. There is an active trade, Bucharest being an entrepôt both for the kingdom of Rumania and for adjacent countries. It imports manufactured goods, and exports grain, wool, honey, wax, tallow, and cattle, the produce of the country. In 1698, when it became the capital of Walachia, it was only a village. It was pillaged by the Servians in 1716; taken by the Russians in 1769 and 1806; occupied by them again in 1828-9 and 1853-4; by the Austrians in 1774, 1789, and 1854; was partly destroyed by fire in 1847; and became the capital of Rumania in 1862. Peace congresses were held here, 1772-3, and in 1812, and in 1886 peace was concluded here between Servia and Bulgaria. Pop. (1899) 282,071. See BUCHAREST, PEACE OF; BUCHAREST, UNIVERSITY OF.

Bucharest, Peace of, a treaty signed 28 May 1812, between Russia and the Porte. In November 1806 the Emperor Alexander took up arms for the protection of Moldavia and Walachia, and on account of the violation of the free navigation of the Bosphorus. He occupied Moldavia, upon which the Porte declared war against Russia, 7 Jan. 1807. An armistice, how-

ever, was agreed upon at Slobosia, 24 Aug. 1807, and after the expiration of the truce in April 1808, it was tacitly continued; but in April 1809 the war was renewed. The Russians advanced to Bulgaria, and after two fierce campaigns remained masters of the Danube. The Porte now offered terms of peace. A congress was opened at Bucharest in December 1811. Napoleon did all in his power to induce the Porte to continue the war; but the interposition of Great Britain and Sweden, as well as the concessions of Russia, and the distrust of the Porte toward Napoleon, brought to a conclusion the Peace of Bucharest. The Porte gave up to Russia all Bessarabia and a third of Moldavia, with the fortresses of Choczim, Bender, I-smail, and Kilia, so that the Pruth, as far as its confluence with the Danube, became the boundary between the two powers, and from thence the left bank of the Danube as far as Kilia, and even to its entrance into the Black Sea. The Russians gave back the rest of their conquests. In Asia the boundaries were established as before the war. The boundary then settled between Russia and Turkey was modified in favor of the Porte at the Peace of Paris, 30 March 1856.

Bucharest, University of, a university in the city of Bucharest, under the control of the state government of Rumania. It was founded in 1864. In addition to the usual academic, scientific, and professional departments, with courses followed by about 4,300 students, there is a school of pharmacy. There are museums and laboratories connected with the university.

Bücheler, Franz, frants bük'ë-ler, German philologist: b. Rheinberg, 3 June 1837. He studied at Bonn and has been professor there from 1870. His specialty has been in the field of ancient Italian dialects. He has published 'Grundriss der lateinischen Deklination' (1866), and other important works, and since 1878 has been an associate editor of the 'Rheinisches Museum für Philologie.'

Booker, Anton von, än'tōn fōn boo'hër, German polemical writer: b. Munich, 8 Jan. 1746; d. 1817. He was educated in the Latin schools of the Jesuits, studied at Ingoldstadt, and was consecrated priest in 1768. In his different offices as a public teacher he did a great deal in his day to instruct and enlighten his country. He incurred the enmity of the Jesuits by his satirical attacks upon them. His contributions to the history of the Jesuits in Bavaria (Beiträge zur Geschichte der Jesuiten in Baiern) are of great historical value. His collected works appeared in 1819-20.

Buchez, Philippe Joseph Benjamin, fê-lêp zhô-zêf bōn-zha-mān bū-shā, French philosopher: b. Matange-la-Petite (now in Belgium), 31 March 1796; d. Rodez, France, 12 Aug. 1865. He gave himself up to the study of the natural sciences, and in particular to medicine, receiving his doctor's degree in 1825. He was bitterly hostile to the government of the Restoration, and was one of those who, in 1821, founded the French Society of Carbonari. He became chief editor of the 'Journal des Progrès des Sciences et Institutions Médicales,' and in 1826 assisted in editing the 'Producteur,' a weekly paper which advocated the doctrines of Saint-Simonism. In 1831 he founded a journal of moral and political science, called 'L'Européen,' in which he expounded those doctrines which owe

their origin chiefly to himself, and have been collectively denominated 'Bucheism.' The fundamental idea of his system is that of the progress and development of the human race. But progress presupposes an aim, and this aim must be pointed out beforehand, or *revealed*. Thus the idea of progress leads him to the orthodox belief in revelation. This theory is worked out in his 'Introduction à la Science de l'Histoire' (1833); and his 'Essai d'un Traité Complet de Philosophie au Point de Vue du Catholicisme et du Progrès' (1839). Along with his predilections for the Catholic Church he still retained his strong democratic and republican opinions, and with M. Roux-Lavergne published 'Histoire Parlementaire de la Révolution Française, ou Journal des Assemblées Nationales, depuis 1789 jusqu'en 1815' (40 vols. 1833-8). After the revolution of 1848 he was elected to the constituent National Assembly, of which he was soon appointed president. Thenceforth he held aloof from public life, prosecuting his studies and writing several works, among which is the 'Histoire de la Formation de la Nationalité Française' (1859).

Buchholz (booh'hälts) Family, a series of sketches by Julius Stinde, representing life among the middle-classes of the German capital. The books are entertainingly written, and are very popular in Germany.

Büchner, Friedrich Karl Christian Ludwig, frêd-rih karl krës'ti-ān lood-vig buh'nër, German physician and materialist philosopher: b. Darmstadt, 20 March 1824; d. Darmstadt, 1 May 1899. He studied at Giessen, Strasburg, Würzburg, and Vienna; became a lecturer at Tübingen University; and, in 1855, published 'Kraft und Stoff' (14th ed. 1876; English translation, 'Force and Matter' 1870), in which he attempted scientifically to establish a materialistic view of the universe. A violent controversy was raised; and Büchner saw himself compelled to resign his university post, and begin medical practice in Darmstadt. He wrote numerous contributions to periodicals on physiological and pathological subjects, as also in support of his atomistic philosophy; published in the latter department 'Natur und Geist' (1857); 'Aus Natur und Wissenschaft' (1862-84); as well as works on Darwinism, the idea of God, the intelligence of animals, etc.; and has translated Lyell's 'Antiquity of Man' (1864).

Büchner, Georg, gā'örg, German poet, brother of F. K. C. L. Buchner (q.v.): b. Godd-leau, near Darmstadt, 17 Oct. 1813; d. Zurich, Switzerland, 19 Feb. 1837. In 1834 he entered the political arena with a manifesto entitled 'The Rural Messenger,' and bearing the motto: "Peace to the cabin; war to the palace." To escape arrest he fled to Strasburg, where he studied the philosophies of Descartes and Spinoza. He wrote a drama in 1834, on 'The Death of Danton,' the work of a genuine but undisciplined poet. His 'Complete Works,' with biography, was published in 1879.

Buchner, Hans, hänts boo'h'nër, German scientist: b. Munich, 1850. After studying at the universities of Strasburg and Giessen, he became lecturer on hygiene at Munich in 1880 and professor in 1892. He has made many important researches in bacteriology.

BUCHNER—BUCK

Büchner, Luise, loo-êz bün'nër, German poet and novelist, sister of Georg Büchner: b. 12 June 1821; d. Darmstadt, 28 Nov. 1877. Her first publication, 'Women and Their Calling' (1855), was followed by many others on the "woman's rights question"; it commanded much attention, and reached a fifth edition (1883). She wrote a volume of tales, 'From Life' (1861); 'Poet-Voices of Home and Foreign Lands'; several original poems; 'Woman's Heart'; some 'Christmas Stories'; etc.

Büchner, Max, German traveler and scientist: b. Hamburg, 25 April 1846. After serving as surgeon in the German army and navy, he traveled around the earth (1875), and spent some time in New Zealand. In 1878 he bore presents from the emperor to Muatiamvo, in the kingdom of Lunda, in equatorial Africa. After several vain attempts to break through toward the north, he returned to the coast. In 1884 he accompanied Nachtigal in founding the colonies of Togo and Kamerun, in western Africa, where he acted temporarily as representative of the German empire, fought the natives, and concluded treaties with chiefs in the interior. In 1888, as conservator of the Ethnographical Museum of Munich, he traveled in Australia, Guinea, and East Asia. He wrote 'A Trip Through the Pacific Ocean' (1878); and 'Kamerun' (1888).

Buchon, Jean Alexandre, zhôn ä-lëks-ändr bü-shôn, French historical writer: b. Ménetou-Salon, 21 May 1791; d. 30 April 1846. Having gone to Paris, he became collaborateur on several liberal journals, and early took part in the opposition to the restoration. He was in consequence several times prosecuted by the government, and his writings, such as his 'Vie de Tasse' (1817), were interdicted. In 1821 he gave a course of lectures in the Athénæum on the history of dramatic art in England; and in the following years he traveled over the greater part of Europe for the purpose of collecting documents to illustrate the history of France during the Middle Ages. After his return he published his 'Collection des Chroniques Nationales Françaises, écrites en Langue Vulgaire du XIII^eme au XVI^eme Siècle' (47 vols. 1824-9), which he began with the 'Chroniques de Froissart' (15 vols. 1824-6). He was appointed inspector of the archives and libraries of France in 1828, and in 1829 inspector-general of the departmental and communal archives; but soon lost his office through a change of ministry. In addition to the works of this indefatigable writer already mentioned, may be named his 'Histoire Populaire des Français' (1832); 'La Grèce Continentale et la Morée' (1843); 'Histoire des Conquêtes et de l'Etablissement des Français dans les Etats de l'ancienne Grèce sous les Ville-Hardouin' (1846); besides his editions of Brantôme, etc., and his articles in cyclopedias and magazines.

Buchtel, bük'tël, Henry Augustus, American clergyman and educator: b. Akron, Ohio, 30 Sept. 1847. He was educated at Asbury (now De Pauw) University, entered the Methodist ministry, and held pastorates in various parts of Indiana, as well as in New York, New Jersey, and Colorado. Since the opening of 1900 he has been chancellor of the University of Denver.

Buchtel College, a co-educational institution in Akron, Ohio, founded in 1871, under the auspices of the Universalist Church, and named for John R. Buchtel, who gave it \$500,000. In 1901 its endowment was \$150,000, and the value of the buildings and grounds was estimated at as much more. It had 17 professors, and 282 students, and some 9,000 volumes in its library.

Buchu, bū'kū, a South African name for several species of *barosma*, especially *B. crenata*, *crenulata*, and *serratifolia*. They belong to the order *Rutacea*, and the section *Endiosmea*. They have a powerful and usually offensive odor, and have been recommended as antispasmodics and diuretics.

Buck, Carl Darling, American philologist: b. Bucksport, Me., 2 Oct. 1866. He graduated from Yale in 1886; took the degree of Ph.D. there in 1889; and was a member of the American School of Classical Studies at Athens in 1887-9. In 1892, he became professor of Sanskrit and comparative philology at the University of Chicago. He has written 'Vocalismus der Oskischen Sprache'; 'Discoveries in the Attic Deme of Ikaria' (in 'Papers of the American School of Classical Study, Athens,' Vol. V.); 'The Oscan-Umbrian Verb System'; 'Latin Grammar' (with W. G. Hale); and several papers in the 'American Journal of Philology.'

Buck, Dudley, American organist and composer: b. Hartford, Conn., 10 March 1839. After musical study at home and in Leipsic, whence he returned in 1862, he became organist at Park Church, Hartford, and successively at St. James' Church, Chicago, Music Hall, Boston, and St. Ann's Church, Church of the Holy Trinity, and Plymouth Church, Brooklyn. Besides his musical work he has written several books: 'A Dictionary of Musical Terms'; a work on 'The Influence of the Organ in History' (1882), etc. The 'Centennial Cantata,' for the opening of the Exposition of 1876, by appointment of the U. S. Centennial Commission, the 'Forty-sixth Psalm,' the 'Legend of Don Munio,' the 'Golden Legend,' and the 'Marmion' symphonic overture, are among his larger works with orchestra. He has also composed chamber music, songs, and male-voice pieces. Among his later works may likewise be mentioned 'The Voyage of Columbus,' 'The Light of Asia,' 'The Christian Year,' and 'Deseret,' a comic opera.

Buck, Jirah Dewey, American physician and theosophist: b. Fredonia, N. Y., 1838. He graduated in 1864 from the Cleveland Homœopathic College, became professor in that institution and later settled in practice in Cincinnati. He was afterward made professor of therapeutics in the Pulte Medical College. He is well-known for his theosophical studies and has been elected president of the Theosophical Society in America. Among his works are 'The Nature and Aims of Theosophy'; 'A Study of Man and the Way to Health'; 'Mystic Masonry'; 'Browning's Paracelsus and Other Essays'; 'Why I Am a Theosophist.'

Buck, a name sometimes distinctively appropriated to the adult male of the fallow deer, the female of which is a doe. The term is often also applied to the male of other species of deer, as of the roebuck, although never to that of the red deer, which, when mature, is a stag or a hart.

BUCK-BEAN — BUCKINGHAM

Buck-bean, Bog-bean, or Marsh-trefoil (*Menyanthes trifoliata*), a beautiful plant belonging to the *Menyanthes*, a subdivision of the natural order of the *Gentianaceae*. It is common in spongy, boggy soils, throughout the northern temperate lands, and flowers about the latter end of May and early June. It has a procumbent stem rising to a height of 6 to 12 inches, and covered by the sheaths of the leaves, and a creeping jointed root. The leaves are trifoliate (like those of clover), with obtuse, ovate leaflets. The flower-stalk terminates in a thyrse of white flowers, rose-colored outwardly. The calyx is five-parted, the corolla funnel-shaped, spreading, and clothed on the inner surface with a coating of dense fleshy hairs. The fruit consists of a one-celled, two-valved capsule containing numerous seeds. The whole plant, the root especially, has an intensely bitter taste, and an extract of it ranks as a valuable tonic quite equal in its effects to gentian. It is not so frequently employed now, however, as it used to be. It is said to be beneficial in intermittent fevers, gout, liver complaints, dropsy, scurvy, etc. In the north of Europe it is sometimes used instead of hops to give bitterness to beer; and in Lapland an unpalatable kind of bread is made from the powdered roots.

Buck-board, a four-wheeled vehicle having the seat mounted on an elastic board instead of springs. Buckboards were intended originally for rough and hilly roads and were rather primitive in construction, but became so popular that the styles at present employed are greatly improved in form and finish.

Buckets, in water-wheels, are a series of cavities into which the water is delivered, on the circumference of the wheel to be set in motion. By the revolution of the wheel the buckets will be alternately erected so as to receive water and inverted so as to discharge it: the loaded side will descend, and present the empty buckets in succession to the current, and thus keep up a constant revolution of the wheel. Buckets made of wood and of various metals, are also used for many other mechanical purposes, as in grain-elevators, dredges, etc.

Buckeye. The name in the central and southern United States for native species of trees of the horse-chestnut genus, especially the sweet buckeye (*Asculus octandra*), abundant in Ohio and southward. See HORSE-CHESTNUT.

Buckeye State, a nickname applied to the State of Ohio.

Buck'ham, Matthew Henry, American educator: b. Leicestershire, England, 1832. He came to the United States in infancy. In 1851 he graduated from the University of Vermont and later became principal of the academy of Lenox, Mass. After studying and traveling in Europe, he became professor of Greek in the University of Vermont, and in 1871, president. He has written numerous sermons, addresses, and reviews.

Buckhound. See DEERHOUND.

Buckingham, bük'ing-äm, George Villiers, Duke of, British courtier: b. Brookesby, Leicestershire, 20 Aug. 1592; d. Portsmouth, 24 Aug. 1628. He was the unworthy favorite of James I. and Charles I. His family went to

England from Normandy in the time of William the Conqueror. His father was George Villiers, Knight; his mother was descended from the ancient family of Beaumont. His father died when he was 13, and at 18 he was sent to France, where he resided three years, and acquired great skill in all bodily exercises. This, together with his beauty of person and graceful manners, made so great an impression on James I., who gave him the familiar name of Steenie, that in less than two years he was made a knight, a gentleman of the bed-chamber, baron, viscount, Marquis of Buckingham, lord high admiral, lord warden of the Cinque Ports, etc., and at last dispenser of all the honors, offices, favors, and revenues of the three kingdoms, according to the dictates of his ambition, his cupidity, and his caprice. The nation was indignant at seeing merit undervalued, the people trampled upon, the nobility humbled, the crown impoverished and degraded, to elevate and enrich a weak and insolent favorite. Such rapid and undeserved promotion likewise caused many private jealousies. In 1623 he engaged in a romantic adventure with Charles, Prince of Wales, in connection with which traitorous views have been attributed to him. The Earl of Bristol was negotiating a marriage for the prince with the Infanta of Spain. Buckingham persuaded the prince to go to Madrid, and carry on his suit in person. They set out incognito, passed through various adventures, and saw on their way the Princess Henrietta Maria of France, whom Charles afterward married. The result of this journey is well known. The marriage was broken off, war declared with Spain, and Bristol was impeached. Buckingham was created a duke during his absence, and whatever misconduct may have been associated with the design or execution of his mission, his favor with the king and prince remained unimpaired. James died in March 1625, and in May of the same year Buckingham was sent to France as proxy for Charles I., to marry the Princess Henrietta Maria. In the following year the unpopularity of the war with Spain, and the failure of the expedition to Cadiz, caused his impeachment, from the consequences of which he was saved by his favor with the king. His intrigues soon after brought on war with France, and he was intrusted with an expedition to succor the Rochelle, but they refused his aid, and he carried his forces to the Isle of Rhé, where, after three months spent in unskilful operations, he suffered a defeat in re-embarking which cost 2,000 men. Notwithstanding this proof of incapacity, a large force was again intrusted to him to renew the attempt on Rochelle. He went to Portsmouth to superintend the preparation, and there was assassinated by John Felton, a lieutenant who had withdrawn from the army in consequence of being disappointed in promotion.

Buckingham, George Villiers, Duke of, son of the preceding: b. Westminster, 30 Jan. 1628; d. Kirkby Moorside, Yorkshire, 16 April 1687. After studying at Trinity College, Cambridge, he traveled abroad, and on his return home, after the commencement of the civil war, he was presented to the king at Oxford. He served in the royal army, under Prince Rupert and Lord Gerard. His estate was seized

BUCKINGHAM

by the Parliament; but having obtained the restoration of it, he traveled with his brother into France and Italy. In 1648 he returned to England, and was with Charles II. in Scotland, and at the battle of Worcester. He followed that prince abroad, and served as a volunteer in the French army in Flanders. He afterward returned to England, and in 1657 married the daughter of Lord Fairfax, by which means he repaired the ruin of his fortune in the royal cause. He, however, preserved the favor of Charles II., and at the Restoration was made master of the horse. He also became one of the king's confidential ministers, who were designated by the appellation of the "Cabal" (1667-73). His political conduct was, like his general behavior, characterized by unprincipled levity and imprudence. In 1666 he engaged in a conspiracy to effect a change of the government; notwithstanding which, he recovered the favor of King Charles, which he repeatedly abused. The profligacy of his private life was notorious. He seduced the Countess of Shrewsbury, and killed her husband in a duel; and he was more than suspected of having been the instigator of the infamous Col. Blood to his brutal outrage against the Duke of Ormond, whom he attempted, with the assistance of other ruffians, to carry to Tyburn and hang on the common gallows. In 1677 he was, together with the Earls of Shaftesbury and Salisbury and Lord Wharton, committed to the Tower for a contempt, by order of the House of Lords, but on petitioning the king, they were released. He plotted against the government with the Dissenters, and made himself an object of contempt to all parties. Pope ('Moral Essays,' epistle 3d) has more strikingly than accurately described his death. His abilities were far superior to those of his father; and among his literary compositions the comedy, or rather the witty burlesque, of 'The Rehearsal' may be mentioned as a work which displays no common powers, and which greatly contributed to the correction of a corrupted public taste.

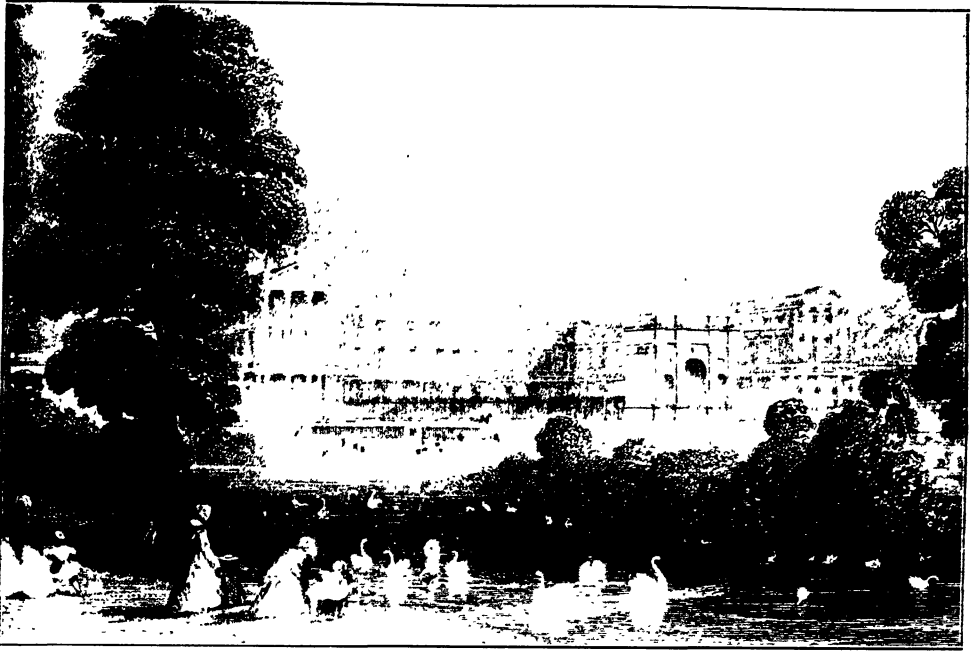
Buckingham, James Silk, English traveler and editor: b. Flushing, Cornwall, 25 Aug. 1786; d. London, 30 June 1855. He made three voyages to Lisbon while yet a mere boy. In 1815 he went to Bombay, and in the following year, after many vicissitudes, to Calcutta, where he established the *Calcutta Journal*, but the censorship of the press was then in full force in India, and Buckingham, having offended government, his printing presses were seized, and he himself compelled to quit the presidency of Bengal and return to England, where he began to deliver lectures in London in favor of free trade to the East, and the extinction of the East India Company's monopoly. He also established in London, 1824, the *Oriental Herald*, and four years later the *Athenaeum*, now one of the foremost English weeklies, and prepared for the press the manuscript journals of his travels. In 1822 appeared 'Travels in Palestine'; in 1825, 'Travels in Arabia'; in 1827, 'Travels in Mesopotamia'; and in 1830, 'Travels in Assyria and Media.' In 1832 he was chosen member of Parliament for Sheffield, and retained his seat till 1837. Subsequently to this he made a tour of three years in America, resulting in the publication of eight volumes on the United States, and one on British North America. In 1843 he became secretary to

the British and Foreign Institute—a literary club which he had mainly contributed to form; but in this capacity he unfortunately drew upon himself the animadversions of 'Punch,' which at last fairly extinguished the society. In the later years of his life he delivered lectures in various parts of the country. He was a zealous promoter of the temperance cause, and president of the London Temperance League. In 1849 appeared his 'National Evils and Practical Remedies.' He also published two volumes on Belgium, the Rhine, and Switzerland, and two on France and Piedmont, the result of tours on the Continent. His last work was his 'Autobiography,' two volumes of which appeared in 1855, but its completion was prevented by the author's death. A few years before this the East India Company had granted him a pension, which was afterward continued to his widow, and he had also a pension of £200 a year from the civil list.

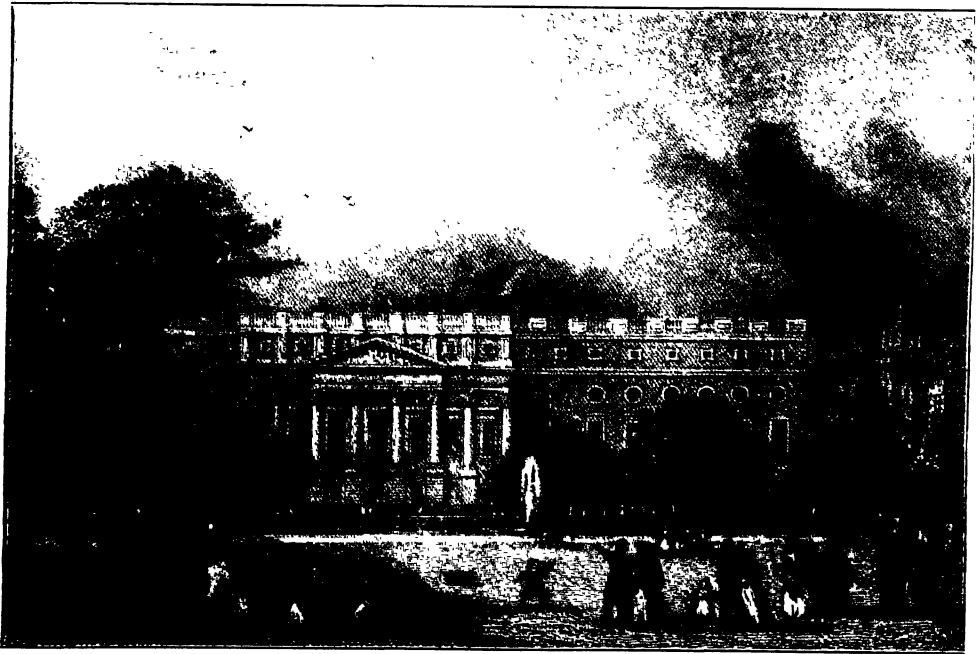
Buckingham, Joseph Tinker, American journalist: b. Windham, Conn., 21 Dec. 1779; d. Cambridge, Mass., 11 April 1861. His father exhausted his whole property in supporting the American army during the Revolution, and died leaving a family without means of support. At Worthington, Mass., Joseph was apprenticed to a farmer, with whom he remained for several years, during which he made himself acquainted with the rudiments of an English education. At 16 he entered a printing-office and became acquainted with the elements of the profession in which he was afterward to gain distinction. In Boston, 1806, he began life for himself by the publication of 'The Polyanthus,' a monthly magazine, which, after one year, was discontinued and not resumed until 1812. In 1809 he published for six months the 'Ordeal,' a weekly. In 1817 he began the publication of 'The New England Galaxy and Masonic Magazine,' which he continued until 1828. From 1831 to 1834 he published 'The New England Magazine.' In 1824 he published the first number of the *Boston Courier*, which he continued to edit until 1848. Mr. Buckingham was several times elected to the legislature, serving in both Houses. His publications include 'Specimens of Newspaper Literature, with Personal Memoirs, Anecdotes and Reminiscences' (1850), and 'Personal Memoirs and Recollections of Editorial Life' (1852). His present residence is in Cambridge, Mass.

Buckingham, William Alfred, American politician: b. Lebanon, Conn., 28 May 1804; d. Norwich, 3 Feb. 1875. He was educated in the common schools; worked on his father's farm; was also a school-teacher, and at Norwich, 1825, began business in dry-goods, becoming later a manufacturer and something of a capitalist. In 1849 he was elected mayor of Norwich, to which office he was repeatedly chosen. For nine years (1858-66) he was governor of Connecticut, and as one of the most efficient of the "war governors" achieved a national fame. He served as United States senator from 1869 till his death. He was active in the temperance cause, and a liberal giver to Yale College and to many benevolent objects.

Buckingham, or Bucks, an inland county, England, bounded north and northwest by Northampton; northeast and east by Bedford and Hertford; southeast by Middlesex; southwest by Berks, and west by Oxford. Its length,



BUCKINGHAM PALACE, LONDON, ENGLAND.



HAMPTON COURT, LONDON.

BUCKINGHAM — BUCKLANDITE

north to south, is about 45 miles; greatest breadth, east to west, 23 miles; area, 746 square miles. The vale of Aylesbury, stretching through the centre of the county, and celebrated for its fertility, furnishes rich pasturage for vast numbers of cattle and sheep. The total area under all kinds of crops, bare fallow, and grass is somewhat more than 400,000 acres, of which considerably more than half is in permanent pasture. The chief cereal crops are wheat, barley, and oats, each occupying annually from about 22,000 to 30,000 acres. Between 4,000,000 and 5,000,000 pounds, or about 1,900 tons of butter, are annually made in this county. The breeding and fattening of cattle are largely carried on, Herefords and short-horns being favorite breeds. The manufactures of Buckinghamshire are unimportant. Among them are straw-plaiting and the making of thread lace, wooden articles, such as beechen chairs, turnery, etc. There are also paper-mills, silk-mills, and other manufactories. The mineral productions of this county are of no great importance. The county is watered by the Ouse, the Thame, the Thames, and other streams, and is intersected by the Great Western and North-western R.R.'s. Buckingham is nominally the county town, but Aylesbury is the assize town. Buckinghamshire used to contain three parliamentary boroughs, namely, Aylesbury, Buckingham, and High or Chipping Wycombe, which now give name to corresponding parliamentary divisions. The county thus returns three members to the House of Commons. It gives the title of earl to the family of Hobart Hampden. Pop. (1901) 195,234.

Buckingham, a municipal and formerly a parliamentary borough of England, capital of the county of its own name, 50 miles northwest of London, situated on a peninsula formed by the Ouse, which is here crossed by three stone bridges. The town hall and jail are large and commodious buildings. The parish church, erected in 1781, is a spacious structure, with a square tower, surmounted by an elegant spire, and there are also several other places of worship, and a free grammar-school, founded by Edward VI. Malting and tanning are carried on to some extent; and a good deal of business is done in wool and hops. In the vicinity are several limestone quarries, and one of marble. Pop. about 3,500.

Buckingham Palace, a royal palace in London, facing St. James's Park. It is the town residence of the king.

Buckland, Cyrus, American inventor: b. Manchester, Conn., 10 Aug. 1799; d. 26 Feb. 1891. After learning the trade of a machinist, he assisted in building the machinery for the first cotton-mills erected at Chicopee Falls, and became, in 1828, patternmaker in the United States armory, Springfield, where he remained for 28 years, becoming master mechanic. He designed machinery and tools for the manufacture of firearms; remodeled old weapons and designed new ones; perfected a lathe for turning out gun-stocks; invented machines to bore and turn gun-barrels and for rifling muskets, and many other novelties in the manufacture of firearms and ordnance. Much of his machinery was adopted by foreign governments. As he received nothing for his labor at the armory, excepting his salary, Congress voted him

\$10,000 when ill-health compelled him to resign. In all he received from Congress for his inventions \$70,000.

Buckland, Francis Trevelyan, English naturalist: b. Oxford, 17 Dec. 1826; d. London, 19 Dec. 1880. He was the son of William Buckland (q.v.); graduated at Christ Church, Oxford, and having studied medicine in Paris and London, he was for some time house surgeon to St. George's Hospital, when he joined the 2d Life Guards as assistant surgeon, a post which he held for nine years. His strong passion for natural history soon absorbed all his thoughts, and he became a constant contributor to 'Field' and other periodicals. Latterly he devoted himself with enthusiasm to pisciculture, a subject on which he was long the leading authority. His advice on the subject was sought by several foreign governments, and he was the means of introducing salmon and trout into the Australian and New Zealand waters. He was appointed inspector of salmon fisheries in 1867, and his reports as commissioner led to the passing of several useful acts of Parliament. Besides a great quantity of pleasant gossip articles contributed to various periodicals, he published 'Curiosities of Natural History' (1857-72); the 'Logbook of a Fisherman and Zoologist' (1876); a 'Natural History of British Fishes' (1881); and other works.

Buckland, William, English geologist: b. Axminster, Devon, 12 March 1784; d. 15 Aug. 1856. He was educated first at Winchester, afterward at Corpus Christi College, Oxford, took his degree of B.A. in 1803, and obtained a fellowship in 1808. From early childhood he had been familiar with the ammonites and other fossils in the lias quarries near his native town, and with advancing years the bent of his mind to geological pursuits was developed and confirmed. In 1813 he was appointed reader in mineralogy at Oxford, and in 1818 a readership of geology was instituted for him. In 1825 he was presented by his college to the living of Stoke Charity, near Whitechurch, Hants, and the same year he became one of the canons in the Christchurch Cathedral, Oxford. He was one of the eight selected to write the celebrated 'Bridgewater Treatises,' and in 1836 his essay was published, under the title of 'Geology and Mineralogy Considered with Reference to Natural Theology.' In 1845, he was made dean of Westminster, and in 1847 one of the trustees of the British Museum. His papers contributed to various societies and periodicals were very numerous. He was a fellow and twice president of the Geological Society of London, and of the Royal Society from 1818.

Bucklandia, a handsome evergreen Javanese and East Indian tree (*B. populnea*), of the natural order *Hamamelidaceae*, the only species of its genus. It is said to attain considerable height, often more than 30 feet without branches, and occasionally a circumference of more than 20 feet at the height of a man's chest from the ground. Its timber is widely used in the East.

Bucklandite, the name of two minerals: (1) Bucklandite of Hermann, a variety of epidote; (2) Bucklandite of Levy, a variety of allanite (Dana), called orthite in the 'British Museum Catalogue.' The former authority

BUCKLE—BUCKNELL UNIVERSITY

terms it anhydrous allanite. It is found at Arendal, Norway.

Buckle, Henry Thomas, English historian: b. Lee, Kent, 24 Nov. 1822; d. Damascus, 29 May 1862. He was the son of a wealthy merchant, and received his education partly at home, and partly at Dr. Halloway's School, Gordon House, Kentish Town. His delicate health prevented his remaining long at school, but his love of learning and indefatigable industry as a student supplied any deficiencies in his training, and he was to a great extent self-educated. At an early age he entered his father's counting-house, but he displayed no aptitude for business; and when at the age of 18 his father's death left him an ample fortune, he devoted himself entirely to study. The only thing he allowed to distract him from his more serious pursuits was his favorite game of chess, in which he attained such excellence as to be recognized as one of the first English masters of the game; but even this he gave up when he found it encroached too much on his time. He had formed a plan, to which he dedicated his life, of writing the 'History of Civilization in England' in conformity with certain philosophical principles, and with an exhaustive treatment in regard to details which he deemed indispensable to historical accuracy, which made the work he had undertaken one of almost incalculable magnitude. He only succeeded in finishing two volumes. The first, published in 1858, stated with copious illustrations the plan of the work; the second, issued in 1861, contained a digression on the histories of Scotland and Spain, intended further to illustrate his design, and demonstrate the principles on which it was based. These works gave rise to much controversy, but it has been generally agreed that they exhibit great boldness and originality of design, with profound and accurate scholarship, and possibly also with a good deal of what was the object of the historian's strongest aversion in others, dogmatism. His death occurred when he was on a voyage undertaken for the restoration of his health.

Buckle, a metal instrument consisting of a rim and tongue, forming a clasp, used for fastening straps or bands in dress, harness, etc. In making buckles, both brass and iron are used, and the chief kinds are called tongue, roller, brace, and gear buckles. The use of buckles, instead of shoe-strings, was introduced into England during the reign of Charles II. They soon became very fashionable, attained an enormous size (the largest being called Artois buckles, after the Comte d'Artois, brother of the king of France), and were usually made of silver, set with diamonds and other precious stones. In the latter half of the 18th century the manufacture of buckles was carried on most extensively in Birmingham, there being at one time not less than 4,000 people directly employed in that city and its vicinity, who turned out 2,500,000 pairs of buckles annually. When the trade was at its height, however, fashion changed, and in 1791 buckle-makers petitioned the Prince of Wales for sympathy, on the ground that, owing to the introduction of shoe-strings, their trade was almost ruined. The prince promised to assist them as far as he could by wearing buckles himself, and enjoining his household to do the same; but fashion

was too strong even for him, and before the close of the century, a great staple trade of Birmingham had become extinct, though shoe-buckles are still by no means unknown.

Buckler, a kind of small shield formerly worn on the left arm, a piece of armor varying in form and material, among the latter being wickerwork, wood covered with leather, a combination of wood and metal, etc.

Buckley, James Monroe, American clergyman and editor: b. Rahway, N. J., 16 Dec. 1836. He was educated at Pennington Seminary and Wesleyan University, and studied theology at Exeter, N. H., and in 1858 entered the ministry of the Methodist Episcopal Church. He has had charges at several places, including Detroit, New York, and Brooklyn, the last of which he retained from 1866 to 1880. Since 1880 he has been editor of the New York *Christian Advocate*. He has published 'Two Weeks in the Yosemite and Vicinity' (1873); 'Christians and the Theatre' (1876); 'Oats or Wild Oats' (1885); 'Travels in Three Continents' (1895); 'Extemporaneous Oratory' (1899); and other works.

Buckley, Samuel Botsford, American botanist and geologist: b. Torrey, Yates County, N. Y., 9 May 1809; d. Austin, Texas, 18 Feb. 1884. He graduated from Wesleyan University in 1836. During his travels in the Southern States he investigated the botany, chonology, etc., of those regions, discovering many new species of plants and shells. Among the flora was the new genus *Buckleya*, which was named in his honor. He determined the height of Mount Buckley, North Carolina, and of several other summits. From 1860-1 he was connected with the State survey of Texas and from 1866-7 was State geologist of Texas. He wrote many papers of a scientific nature and a work on the trees and shrubs of the United States.

Buckminster, Joseph Stevens, American clergyman: b. Portsmouth, N. H., 26 May 1784; d. 9 June 1812. His father, Joseph Buckminster, a scholarly and eloquent preacher, sent the son to Harvard, where he was graduated in 1800, afterward becoming a teacher in Phillips Exeter Academy, among his pupils being Daniel Webster. In 1804 he entered upon the work of the ministry as pastor of the Brattle Street Church, Boston, and at once took his place as a writer and preacher of the finest gifts, to grow in power and public esteem until the day of his premature death. He was a member of the Anthology Club of Boston, and a contributor to the 'Monthly Anthology.' His pulpit influence aided to develop a more literary style of sermon, while his oratorical ability was equal to his skill in composition. He was a representative of the Liberal Congregationalism, which, soon after his death, became Unitarian in belief. His works, in two volumes, were published in 1839. See also his 'Memoirs,' by his sister (1851).

Bucknell University, a co-educational institution in Lewisburg, Pa.; organized in 1846, under the auspices of the Baptist Church; reported in 1901: Professors and instructors, 31; students, 500; volumes in the library, over 19,000; grounds and buildings valued at more than \$350,000; endowment, \$425,000; president, John H. Harris, LL.D.

BUCKNER—BUCKTAILS

Buck'ner, Simon Bolivar, American soldier and politician: b. Kentucky, 1 April 1823. He was graduated at West Point in 1844, taught there, as assistant professor, during the next two years, and served in the Mexican war, 1846-8, under Gens. Taylor and Scott. He was brevetted first lieutenant, and also captain, for gallantry at the battles of Churubusco and Molino del Rey. From 1848 to 1850 he served at West Point as assistant instructor in infantry tactics. In 1855 he resigned from the army and engaged in various occupations, civil and military, in Illinois and Kentucky. When the Civil War began he joined the Confederate army as a brigadier-general. Afterward he rose to distinction, attaining the rank of lieutenant-general, and taking a prominent part in several important events of the war, notably in the defense and surrender of Fort Donelson, 16 Feb. 1862. He was one of the pall-bearers at Gen. Grant's funeral in 1885, by the personal selection of the great soldier himself, who had been warmly attached to him for many years. In 1806 he was nominated for vice-president by the National (Gold) Democrats, having previously served a term as governor of Kentucky.

Buckram, a coarse fabric, linen or cotton, sized with glue. It is used in making garments to give them, by stiffening, the form intended, and as a cover in bookbinding.

Buck'shot, a leaden shot larger than swan-shot. About 160 or 170 of them weigh a pound. They are especially designed to be used in hunting deer and other large game.

Buckshot War, 1838, a disputed-election case in Pennsylvania, of national importance as bearing on the nature of the "domestic violence," from which the Constitution requires the Federal government to protect the States. As usual, fraud under legal forms was met by retaliation in defiance of them. The legislature that year had to elect a United States senator; and the return of Democratic candidates in Philadelphia gave that party a majority on joint ballot, though the Senate was 22 Whig (Anti-Masonic) to 11 Democratic. But the Democratic congressional candidate in one of the city districts was defeated; his party charged it to frauds in the Northern Liberties district (now in Philadelphia), and the 10 Democratic election judges threw out its entire vote of some 5,000, giving him the certificate of election. At once the seven Whig judges met and gave the certificate not only to their candidate, but to their legislative candidates who were not elected even with the Northern Liberties vote: obviously to fight till their congressman was restored. The secretary of State was chairman of the Whig State committee, received the Whig certificate first (professedly at least), refused to acknowledge any others, and publicly advised his party to claim the election and hold out. Armed crowds of both parties collected at Harrisburg "to see fair play" when the legislature met, 4 December; and for some days the sessions were held with a roaring mob outside. The Whig returns alone were handed in by the secretary of State; the Whig senate organized, and then adjourned on account of the mob; one member is alleged to have threatened them with "ball and buckshot," whence the name. In the Representatives' hall both parties organized and chose speakers, the Whigs, T. S. Cunningham,

and the Democrats, William Hopkins; the former then adjourned, whereupon the latter held the hall with a guard and the Whigs had to meet outside. The Whig governor, Joseph Ritner, called on the State militia to be ready to rescue the capital from a "lawless mob," and appealed to the commandant, at Carlisle, and next to President Van Buren, for help against "domestic violence," which was refused on the ground that this phrase referred only to insurrection against lawful authorities, whereas this was only a political struggle to determine who the lawful authorities were, in which the government could not decently interfere. (The same excuse was afterward made for leaving Kansas at the mercy of the Border Ruffians, though the Federal court put the United States soldiery into their hands.) About 1,000 militia were brought to Harrisburg; but after a fortnight's stay departed, as the city was entirely quiet, and the rival houses holding regular sessions. The cooler Whigs, however, saw that the secretary of State could not justify his assumption of power; enough Cunningham members joined the Hopkins House to give it a majority, and on the 25th the senate acknowledged it as the true one, whereupon the other broke up and its members gradually drifted in—all but Thaddeus Stevens (q.v.), who would not take his seat during the session. The legislature elected as senator Daniel Sturgeon, then State treasurer, who as such refused to honor Ritner's bill for the employment of the militia.

Buck'skin, a soft leather of a yellowish or grayish color, made originally from deer-skin, but now usually from sheepskin. The softness which is its chief characteristic is imparted by using oil or brains in dressing it. The name is also given to a kind of twilled woolen cloth without a pile or "face."

Buck'stone, John Baldwin, English actor and playwright: b. London, 14 Sept. 1802; d. 31 Oct. 1879. From 1823 to 1853 he was a well-known London comedian. He became manager of the Haymarket Theatre, and produced nearly 200 plays, which were all successful, largely owing to his knowledge of stage effect and humor. He made a visit to the United States in 1840. Among the best of his pieces are: 'The Wreck Ashore'; 'Victorine'; 'Green Bushes'; 'The Flowers of the Forest'; 'Married Life'; 'Leap Year'; 'Second Thoughts'; and 'Nicholas Flam.'

Buckstone, Lucy Isabella, English actress (daughter of John Baldwin Buckstone): b. 1858; d. London, 17 March 1893. After acting for a time in the provinces, she appeared on the London stage in 1875 in the play of 'David Garrick.' Among her best known roles were those of Annette in 'The Bells' and Lucy Ormond in 'Peril.'

Buck'tails, the New York State Democrats opposed to De Witt Clinton, 1812-28; originally the members of the Tammany Society in New York, from the buck's tail worn in their hats as a badge. Their factional opposition to Clinton, under Martin Van Buren and other important local leaders, extended to his advocacy of the Erie Canal, authorized 15 April 1817; the Tammany men were fiercest in opposition to it, and the name "Bucktails" was given to all the anti-Canal Democrats. Clinton was an ungracious

BUCKTHORN — BUD

and tactless politician, and in 1824 the Bucktails carried the State and ousted him from the office of canal commissioner; which primitive bit of "spoils," in a community not then hardened to it, created a reaction that gave him two terms more in the governorship. His death in 1828 dissolved his party, and the "Bucktails," under Van Buren and the other members of the "Albany Regency" (q.v.), became the Democratic party in the State.

Buck'thorn (*Rhamnus catharticus*), a shrub, native of Great Britain, naturalized in the United States, where it is cultivated for hedges in the Mississippi valley and westward. It is not very common in the States east of the Alleghanies. The stem is covered with a dark-brown bark, and divides into numerous branches with strong spines. It grows to seven or eight feet. The leaves are elliptical and serrated. The male and female flowers are on different plants. The calyx is of a greenish yellow. There is no corolla. The fruit is a round black berry, containing four seeds. It flowers in May, and the seeds ripen in September. The berries are medicinal. They form a powerful purgative, but, being harsh in action, are seldom used in modern practice. The juice of the ripe berries, mixed with alum, forms the sap-green of artists. The bark yields a beautiful yellow dye.

Buck'wheat (*Polygonum fagopyrum*, Linn.), a species of grain supposed to be a native of Asia, and called *blé Sarrasin*, or Saracen wheat, by the French, after the Saracens or Moors, who are believed to have introduced it into Spain. It thrives on poor soils, comes rapidly to maturity, and is most frequently planted in tracts that are not rich enough to support other crops. It is extremely sensitive to cold, being destroyed by the least frost, but it may be planted so late and reaped so early as to incur no danger from that source. Its flowering season continues for a long time, so that it is impossible for all the seeds to be in perfection when it is reaped, and the farmer must decide by careful observation at what period there is the greatest quantity of ripe seeds. Buckwheat does not exhaust the soil, and by its rapid growth and its shade it stifles weeds, prevents their going to seed, and leaves the field clean for the next year. As a grain, buckwheat has been principally cultivated for oxen, swine, and poultry; and although some farmers state that a single bushel of it is equal in quality to two bushels of oats, others assert that it is a very unprofitable food. Mixed with bran, chaff, or grain, it is sometimes given to horses. The flour of buckwheat is occasionally used for bread, but more frequently for cakes fried in a pan. In Germany it serves as an ingredient in pottage, puddings, and other food. In the United States it is very extensively used throughout the winter in griddle-cakes. Beer may be brewed from it, and by distillation it yields an excellent spirit. It is used in Danzig in the preparation of cordial waters. Buckwheat is much cultivated by the preservers of game as a food for pheasants. If left standing it affords both food and shelter to the birds during winter. With some farmers it is the practice to sow buckwheat for the purpose only of plowing it into the ground as a manure for the land. The best time for plowing it in is when it is in full blossom, allowing the land to rest till it

decomposes. While green it serves as food for sheep and oxen, and mixed with other proven-der it may also be given with advantage to horses. If sown in April two green crops may be procured during the season. The blossoms may be used for dyeing a brown color. It is frequently cultivated in this country in the Middle States, and also in Brabant, as food for bees, to whose honey it imparts a flavor by no means unpleasant. The principal advantage of buckwheat is that it is capable of being cultivated upon land which will produce scarcely anything else, and that its culture, compared with that of other grain, is attended with little expense.

Buckwheat-tree, an evergreen shrub of the genus *Chiftonia*, natural order *Cyrtellaceæ*; also called titi. It is a native of the southern United States, where it is found in the neighborhood of water. It bears fragrant white flowers, followed by drooping fruits, which suggest the name.

Bucol'ic, a term derived from a Greek word meaning "herdsman." It is equivalent to the word pastoral, derived from the Latin, and is applied to pastoral poetry of the kind especially descriptive of rural life as led by cow-herds and mountain shepherds. Of this class of poetry Theocritus and Virgil left the highest examples. See PASTORAL POETRY.

Bu'crane, an ornamental design carved in relief on the altars of Greece and Rome. It represented an ox skull with garlands depending. This decoration is sometimes seen as an architectural detail with other animals' heads introduced in place of the original ox-head.

Bucyrus, Ohio, city and county-seat of Crawford County, situated on the Sandusky River and on the Pennsylvania, the Ohio C., and the Columbus, S. & H. R.R.'s. Stockraising and farming are carried on in the surrounding region and the city is actively engaged in manufacture. Among the products of the mills and shops are machinery, ventilating apparatus, plows, vehicles, and furniture. There are school and county buildings, a reservoir, and waterworks. There is a park in the city, and numerous mineral springs in the surrounding region. Bucyrus was settled in 1818 and incorporated in 1829. Pop. (1900) 6,560.

Bud, a modified shoot in which, owing to the non-development of the axis, the lateral organs become crowded together. It contains the rudiments of future organs, as stems, branches, leaves, and organs of fructification. The usual form of a bud is an elongated ovoid, and according to their position they are described as terminal, that is, formed at the end of a branch, or axillary, that is, produced in the axils of a leaf. Besides the rudimentary organs found in the interior, buds are in cold or temperate climates often covered externally with a viscous and resinous coating, and furnished internally with a downy tissue, destined to defend the enclosed organs from the rigor of winter. No envelopes of this kind are observed on the buds of the greater number of tropical plants. Buds on exogenous plants are in their commencement cellular prolongations from the medullary rays, which force their way through the bark. The cellular portion is surrounded by spiral vessels, and covered with rudimentary

BUD MOTH — BUDD

leaves. When the vascular part of the bud develops the central cellular portion remains as pith, enclosed in a medullary sheath, which isolates it from the parent stem. Thus it remains till the second year. The bud here described, which contains the rudiments of future leaves, branches, etc., is called a leaf-bud. Sometimes more than one bud is found in or near the axil of a single leaf, in which case all but the proper axillary bud are called accessory buds. The buds begin to show themselves as soon as the leaves have taken their full development. They are then very small, as the developed leaves absorb the nutritive juices of the plant, leaving them little nourishment. On the fall of the leaf they enlarge, and take the form they are to retain during winter, in which season they are stationary. On the return of spring they begin to swell, and burst the scales which form their external covering, and the young shoots which these have served to protect now make their appearance. The external scales of the bud are usually deciduous, that is, they fall off when the young shoot appears; sometimes, however, they are persistent. These scales sometimes represent leaf-blades, as in lilac; sometimes stipules, as in the beech; or petioles, as in the horse-chestnut. Flower-buds are produced in the axil of leaves called floral leaves or bracts. They are not capable of extension by the development of the central cellular portion, and instead of the conservative organs of plants, leaves, and branches, they produce the reproductive organs, flowers, and fruit. Perennial herbaceous plants spring from a subterranean bud called the turio, which is developed annually, and from which the new stem is produced. The bulb is a species of bud of this kind. The arrangement of the leaves in a leaf-bud is called its vernalion; of the petals and sepals in a flower-bud, its æstivation.

Bud Moth. An apple pest. See APPLE.

Budæ'us. See BUDE, GUILLAUME.

Budapest, boo'da-pĕst, the united towns of Buda or Ofen, and Pest or Pesth, the one on the right, the other on the left of the Danube, forming the capital of Hungary, the seat of the Hungarian parliament and supreme courts, about 135 miles southeast from Vienna. Buda, which is the smaller of the two, and lies on the west bank of the river (here flowing south), consists of the fortified Upper Town on a hill, the Lower Town or Water Town at the foot of the hill, and several other quarters, including Old Buda farther up the river. Among the chief buildings are the royal castle and several palaces, the arsenal, town hall, government offices, etc.; the Church of St. Matthew, dating from the 13th century, during the Turkish occupation a mosque for 150 years, and recently rebuilt; and the finest Jewish synagogue in the empire. Pest, or the portion of Budapest on the left or east bank of the river, consists of the inner town of Old Pest on the Danube, and a semicircle of districts—Leopoldstadt, Theresienstadt, Elizabethstadt, etc.—which have grown up around it. The river is at this point somewhat wider than the Thames at London, and the broad quays of Pest extend along it for from two to three miles. It is spanned by fine suspension and other bridges. Pest retains, on the whole, fewer signs of antiquity than

many less venerable towns. Its fine frontage on the Danube is modern, and includes the new houses of parliament, opened in 1896, the academy of science, with a library of 180,000 volumes, exchange, custom house, and other important buildings. The oldest church dates from 1500; the largest building is a huge pile used as barracks and arsenal. Other buildings include the old and the new town house, national museum, National theatre, university buildings, various palaces, the Royal Opera House, etc.

Budapest contains the most important of the three universities of Hungary, attended by about 4,500 students, and having over 220 professors, lecturers, etc. Another important educational institution is the technical high schools, with 60 teachers and 1,100 to 1,200 students, and a library of 60,000 volumes. In commerce and industry Budapest ranks next to Vienna in the empire. Its chief manufactures are machinery, gold, silver, copper, and iron wares, chemicals, textile goods, leather, tobacco, etc. A large trade is done in grain, wine, wool, cattle, etc. At Budapest are the largest electrical works in all Europe. Engineers employed there have brought to perfection the science of applying electricity to motors. They constructed there the first successful underground trolley lines. Their ideas have been adopted in the construction of electric roads all over the world. The city contains the important parks of the Stadtwaldchen, about 1,000 acres in extent, and Margaret Island. It is divided into 10 municipal districts, three on the Buda side of the river, and seven on the Pest side, and is governed by an oberbürgermeister, appointed by the king, a bürgermeister, two vice-bürgermeisters and an executive board of eight members chosen for a six years' term by the municipal council of 400. A United States consul is resident here. Budapest is strongly Magyar in character and sentiment, and as a factor in the national life may almost be regarded as equivalent to the rest of Hungary. Old Buda was founded by the Romans about 150 A.D. Pest is of much later origin. From 1541 to 1686 Buda was the seat of a Turkish pasha, the Turks being then driven out. The towns were united as one municipality in 1873. It was not until 1799 that the population of Pest began to outdistance that of Buda; but from that date its growth was very rapid and out of all proportion to the increase of Buda. In 1799 the joint population of the two towns was little more than 50,000; in 1890 it was 506,384; in 1900, 732,322.

Budaun, boo-dä-on', a town of India in a district of the same name in the Rohilkund division of the northwest provinces. It is 140 miles northwest of Lucknow and during the Sepoy rebellion of 1857 was the scene of several hotly contested engagements. Pop. 35,000.

Budd, Joseph Lancaster, American horticulturist: b. Peekskill, N. Y., 5 July 1835. Since 1901 he has been professor of horticulture and forestry in Iowa Agricultural College. As a result of his travels in Russia he has introduced into the United States many hardy Russian trees and shrubs.

BUDDHA

Buddha, bood'a, or būd'a (to know, intelligence), the generic name for a deified teacher of the Buddhists. These hold that innumerable Buddhas have appeared to save the world, among them one in the present period, also known as Sākya-muni, or Saint Sākya, who is believed by some to have been the ninth incarnation of Vishnu; by others the son of the moon, and regent of the planet Mercury. He was a reformer of Brahminism, introducing a simple creed, and substituting a mild and humane code of morality for its cruel laws and usages. His personal name was Siddhartha, and his family name Gautama; and he is often called also Sākya-muni (from Sākya, the name of his tribe, and muni, a Sanskrit word meaning solitary). His father was king of Kapilavastu, a few days' journey north of Benares. Siddhartha was early filled with a deep compassion for the degeneracy and misery of the human race, and a deep feeling of the vanity of earthly things. His melancholy thoughts would not be stifled in the enjoyments of his father's court: he must find peace for his own soul and bestow it on others. To this end he left his father's court and after having attended the schools of the Brahmins without profit and lived for years a life of solitude and asceticism, he at last, by dint of profound meditation, acquired clear notions on the life of man and his relations to the universe, and found out the true path which was to lead his fellow-creatures to the goal of life. It was then that he became the Buddha, and began to teach his new faith in opposition to the prevailing Brahmanism. The first place at which he taught, or, in the mystic phrase of Buddhism, "turned the wheel of the law," was Benares. He soon made many converts, especially among the lowly and oppressed, for his teaching was addressed to all alike, without distinction of person or caste. Many of the Brahmins also joined him, wearied with the severe and oppressive observances of their own religion, which contrasted so unfavorably with the simplicity of the new faith. Among his earliest converts were the monarchs of Magadha and Kosala, in whose kingdoms he chiefly passed the latter portion of his life, respected, honored, and protected.

The theory of the "four sublime verities" lies at the foundation of the doctrines of the Buddhists. The first verity is that pain is inseparable from existence, inasmuch as existence brings old age, sickness, and death; the second, that pain is the offspring of desire, and of faults which desire has made us commit in previous states of existence (for Sākya-muni adopted fully the prevailing doctrine of Brahmanism with regard to the transmigration of souls) or in the present; the third verity tells us that existence, and therefore pain, can only cease through Nirvana; the fourth, that in order to attain Nirvana our desires and passions must be suppressed, every obstacle to the extinction of desire must be set aside, the most extreme self-renunciation must be practised, and we must, in short, forget our own personality so far as possible. The last verity is the most important in its practical

application, as pointing out the way to salvation and providing a rule of conduct. The way to salvation consists of eight parts or conditions that a man must fulfil. The first is in Buddhist language right view; the second is right judgment; the third is right language; the fourth is right purpose; the fifth is right profession; the sixth is right application; the seventh is right memory; the eighth is right meditation. The five fundamental precepts of the Buddhist moral code are not to kill, not to steal, not to commit adultery, not to lie, and not to give way to drunkenness. To these there are added five others of less importance, and binding more particularly on the religious class, such as to abstain from repasts taken out of season, from theatrical representations, etc. There are six fundamental virtues to be practised by all men alike, namely, charity, purity, patience, courage, contemplation, and knowledge. These are the virtues that are said to "conduct a man to the other shore." The devotee who strictly practises them has not yet attained Nirvana, but is on the road to it. The Buddhist virtue of charity is universal in its application, extending to all creatures, and demanding sometimes the greatest self-denial and sacrifice. There is a legend that the Buddha in one of his stages of existence (for he had passed through innumerable transmigrations before becoming "the enlightened") gave himself up to be devoured by a famishing lioness which was unable to suckle her young ones.

There are other virtues, less important, indeed, than the six cardinal ones, but still binding on believers. Thus not only is lying forbidden, but evil speaking, coarseness of language, and even vain and frivolous talk, must be avoided. Buddhist metaphysics are comprised in three theories—the theory of transmigration (borrowed from Brahmanism), the theory of the mutual connection of causes, and the theory of Nirvana. The first requires no explanation. According to the second, life is the result of 12 conditions, which are by turns causes and effects. Thus there would be no death were it not for birth; it is therefore the effect of which birth is the cause. Again, there would be no birth were there not a continuation of existence. Existence has for its cause our attachment to things, which again has its origin in desire; and so on through sensation, contact, the organs of sensation and the heart, name, and form, ideas, etc., up to ignorance. This ignorance, however, is not ordinary ignorance, but the fundamental error which causes us to attribute permanence and reality to things. This, then, is the primary origin of existence and all its attendant evils. Nirvana is eternal salvation from the evils of existence, and the end which every Buddhist is supposed to seek. It is not so easy to determine exactly what this Nirvana means, however; but the best authorities (Burnouf, Turnour, Spence Hardy, Barthélemy Saint-Hilaire, etc.) affirm that it means the complete annihilation of the thinking principle. Sākya-muni did not leave his doctrines in writing; he declared them orally, and they were carefully treasured by his disciples,

and written down after his death. The determination of the canon of the Buddhist scriptures as we now possess them was the work of three successive councils, and was finished two centuries at least before Christ. The religion soon spread through Hindustan, though it was afterward (probably through persecution) entirely banished from it. Many rock temples, inscriptions, etc., testify to its former prevalence in this region. From Hindustan it spread in all directions—to Ceylon, Java, Cochin-China, Laos, Burma, Pegu, Nepal, Tibet, Mongolia, Tartary, China (where Buddha is called Fo), and Japan, in which countries it still prevails. At present it is professed by perhaps a third of the human race.

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Buddhism, Esoteric. See THEOSOPHY.

Buddhis'tic Architecture. See INDIAN ARCHITECTURE.

Bud'ding, in gardening, the art of multiplying plants by causing the leaf-bud of one species (or, more commonly, variety) to grow upon the branch of another. The operation consists in shaving off a leaf-bud, with a portion of the wood beneath it, which portion is afterward removed by a sudden jerk of the operator's finger and thumb, aided by the budding-knife. An incision in the bark of the stock is then made in the form of a **T**; the two side lips are pushed aside, the bud is thrust between the bark and the wood, the upper end of its bark is cut to a level with the cross arm of the **T**, and the whole is bound up with netting or worsted, the point of the bud alone being left exposed. In performing the operation, a knife with a thin flat handle, and a blade with a peculiar edge is required. The following conditions are essential to the success of the operation: First, the bud must be "ripe," that is, fully formed—which is known by its plumpness and hardness. If too young, it will not succeed, because it has not acquired vitality enough to depend upon its own resources, until that new growth has taken place which attaches it to the stock. If too old, "sprung," or beginning to grow, it is also unfit for use, because the new organs belonging to the young growth need an instant and uninterrupted supply of food, which in the beginning the bud cannot obtain from the branch. Secondly, the bark of the stock must "run freely," that is, must separate readily from the wood below it. This separation is necessary in order that the bud may be inserted beneath the bark; and is always attended by the presence of a large quantity of the viscid

matter called cambium, which is in fact a mixture of young tissue in the act of organizing and of organizable matter. The bud coming in contact with this substance, young and full of vitality, readily forms an adhesion with it, and thus the operation is complete. On this account young branches should always be chosen, since the bark never runs so freely, that is, there is never so great a collection of cambium under it in old branches. Those of the year in which the operation is performed are the best, provided they are advanced toward maturity. Shoots far advanced in a second year's growth are, however, often used, and with success. With regard to the time of performing the operation, autumn is preferred in this country, but it may be practised also in spring. Buds take better in autumn, because the stock has at that period ceased growing, and is chiefly occupied in storing up the organizable material required for the nutrition of the young organs, of which the bud, by the act of insertion, has become one. It ought to be borne in mind that the nearer the constitution of the stock approaches that of the bud, the greater is the success that attends this operation. If they are in any considerable degree dissimilar, the operation becomes precarious; if very different, it is impracticable.

In animals, a form of reproduction, as of the hydra, the sea-anemones, the coral polyps, ascidians, etc. The nature of the process, due to rapid cell-division developed locally, is best seen in the hydra (q.v.), where young hydras arise from protuberances, well called "buds," from the side of the parent stock, and later are constricted off and become free individuals. In the corals, as a result of throwing out lateral buds from the base, arises a colony, or compound coral like most of the reef-building forms, such as the brain-coral (*Meandrina*). In the hydra and other animals the new individual arising by budding becomes free from the parent.

Buddleia, būd-lē'ya, or **Buddlea**, a genus of about 70 species of shrubs or trees of the natural order *Loganiaceæ*, natives of the tropics and warmer temperate regions of the world. A few of the hardiest species, none of which are quite hardy in the northern United States, are cultivated as ornamental plants, for which purpose they are specially fitted by their attractive, usually deciduous, but sometimes almost persistent woolly foliage and panicles and their cluster or racemes of tubular or bell-shaped flowers produced abundantly during the summer. The flowers, which in some species are fragrant, range in color from yellow to red, white to purple, and in some cases have more than one color in individual flowers. They may be propagated from seed or cuttings and are found to thrive in well-drained soil in sunny situations. They are popular in the southern United States and the West Indies.

Budé, Guillaume, gē-yōm bū-dā, French scholar, more generally known under the Latin form Budæus: b. Paris, 1467; d. 1540. He was royal librarian and master of *requêtes*. From his 24th year he devoted himself to study with the greatest zeal, in particular to belles-lettres,

to mathematics, and to Greek. Among his philosophical, philological, and juridical works, his treatise 'De Asse et Partibus ejus,' and his commentaries on the Greek language, are of the greatest importance. By his influence the Collège Royal de France was founded. He enjoyed, not only as a scholar, but also as a man and citizen, the greatest esteem. His works appeared at Basel (1557). See E. de Budé, 'Vie de Guillaume Budé' (1884).

Bude (būd) **Light**, an exceedingly brilliant light, produced by directing a current of oxygen gas into the interior of the flame of an argand-lamp or gas-burner, by which intense combustion is established and a dazzling light obtained. This plan of lighting was adopted in the House of Commons in 1840 and continued till 1852, when another system of lighting was introduced. It was invented by Mr. Gurney of Bude, in Cornwall, and hence the name.

Budgell, Eustace, English miscellaneous writer: b. Exeter, 19 Aug. 1686; d. London, 4 May 1736. He was educated at Trinity College, Oxford, went to London, and entered the Inner Temple. He was a relative of Addison, who in 1717, when principal secretary of state in England, procured for Budgell the place of accountant and comptroller-general of the revenue in Ireland. He lost these places when the Duke of Bolton was appointed lord-lieutenant, in 1718, apparently through some dispute. He then returned to England, where, in 1720, he lost \$100,000 by the South Sea bubble. In 1733 he commenced a weekly paper, called 'The Bee,' which was very popular. On the death of Tindal, the author of 'Christianity as Old as the Creation,' a will was produced by which \$10,000 was left to Budgell. This sum was so disproportionate to the testator's circumstances (his whole estate did not amount to so much), and the legacy so contrary to his known intentions, that suspicions arose respecting the authenticity of the testament; and Budgell's reputation was completely blasted. Ruined in fortune and character, he ended his life by drowning himself in the Thames. He wrote 37 papers in the 'Spectator' signed X.; also others in the 'Guardian,' etc.

Budgerigar, the dealer's name for the Australian grass-parakeet (q.v.). This small parrot has become a common cage-bird in all parts of the world, and goes by a great variety of names, among which "zebra," "shell," and "warbling grass-parakeet" are perhaps the most common.

Budg'et, the annual statement relative to the finances of a country, made by the proper financial functionary, in which is presented a balance sheet of the actual income and expenditure of the past year, and an estimate of the income and expenditure for the coming year, together with a statement of the mode of taxation proposed to meet such expenditure. In the United States the budget is in effect made up in the House of Representatives, to which, at the opening of each congressional session, the secretary of the treasury submits a list of estimates of expenditures for the coming year. Upon these the appropriation bills are based by separate committees. The term "budget," however, is not commonly employed in this country. In England the chancellor of the exchequer sub-

mits to Parliament a yearly statement of necessary governmental expenditures.

Budweis, bood'vis (Czech Budejovice), a town of Bohemia, on the navigable Moldau, 133 miles northwest of Vienna by rail. It has a cathedral with a detached belfry dating from about 1550, manufactures of stoneware, porcelain, machines, lead pencils, saltpetre, etc., besides a brisk trade in grain, wood, coal, and salt. In its many educational institutions, including two gymnasia, high, agricultural, trade, industrial, and other schools, instruction is given in both German and Bohemian. In the neighborhood is Schloss Frauenberg (1840-7), the seat of Prince Schwarzenberg. Pop. (1900) 39,400.

Buel, Clarence Clough, American editor and author: b. Laona, Chautauqua County, N. Y., 29 July 1850. He was connected with the New York *Tribune* from 1875 to 1881, when he joined the staff of the 'Century Magazine'; and, in 1883, in conjunction with Robert Underwood Johnson, began the editing of the celebrated 'Century War Articles,' which were afterward expanded into the notable 'Battles and Leaders of the Civil War' (1887).

Bu'el, Samuel, American clergyman: b. Troy, N. Y., 11 June 1815; d. New York, 1 Feb. 1891. He was graduated from Williams College in 1833, and from the General Theological Seminary, New York, in 1837. He was rector successively in Marshall, Mich., Schuylkill Haven, Pa., Cumberland, Md., Poughkeepsie, N. Y., and New York until 1866. From 1866 to 1869 he was professor of ecclesiastical history in the Seabury Divinity School, Farihault, Minn., and professor of divinity there, 1869-71, when he was elected to the chair of systematic divinity and dogmatic theology in the General Theological Seminary, a position which he held until his retirement as professor emeritus in 1888. He wrote 'The Apostolical System of the Church Defended, in a Reply to Dr. Whately on the Kingdom of Christ' (1844); 'Eucharistic Presence, Sacrifice, and Adoration' (1874); 'A Treatise of Dogmatic Theology' (1890); and translated F. H. Reusch's 'Conference at Bonn: Proceedings, August 1875, Between Old Catholics, Orientals, Members of the Anglican and American Churches, from Europe and America' (1876).

Buell, Don Carlos, American military officer: b. Lowell, Ohio, 23 March 1818; d. near Rockport, Ky., 19 Nov. 1898. He was graduated at West Point in 1841, and served in the Mexican war. When the Civil War broke out he was adjutant-general of the regular army, and was made a brigadier-general of volunteers and attached to the Army of the Potomac. In November 1861 he succeeded Gen. W. T. Sherman in command of the department of the Ohio. He resigned from the volunteer service on 23 May 1864, and on 1 June following, also resigned his commission in the regular army. He was president of the Green River (Ky.) Iron Works from 1865 to 1870, when he engaged in coal mining. From 1885 to 1890 he served as United States pension agent at Louisville.

Bu'ell, Marcus Darius, American Methodist clergyman: b. Wayland, N. Y., 1 Jan. 1851. He was graduated at New York University, 1872; studied theology at Boston University,



THE HARBOR OF RIO.



MAY AVENUE, BUENOS AIRES.

The Government House is in the distance. The street's pavement is of Trinidad asphalt laid by an American Company.

BUEN AYRE—BUFF LEATHER

and at the universities of Cambridge, England, and Berlin, Germany, being admitted to the New York East Conference of the Methodist Church, 1875. He was pastor at Portchester, N. Y., Brooklyn, N. Y., and Hartford, Conn., from 1875 to 1884, when he was appointed professor of New Testament Greek and exegesis in Boston University. Since 1889 he has been dean of the theological faculty there. He has written 'Studies in the Greek Text of the Gospel of St. Mark' (1890).

Buen Ayre, *bwān ī'rā*, or **Bonaire**, a small island off the coast of Venezuela, belonging to the Dutch. It is 50 miles in circumference, and inhabited chiefly by Indians, with a small mixture of Europeans; mountainous; producing a few cattle, goats, large quantities of poultry, and a considerable quantity of salt. It has springs of fresh water. On the southwestern side is a good harbor. Pop. (1899) 4,926.

Buena Vista, *bwā'na vēs'tā*, a village of Mexico, seven miles south of Saltillo, where, on 22-23 Feb. 1847, some 5,000 United States troops, under Taylor, defeated 20,000 Mexicans under Santa Ana. The American army engaged at Buena Vista consisted in large part of volunteers, most of whom had no military experience; and on account of the unequal daring and composure displayed by them at different times the battle would have been lost again and again but for the heroic conduct of the regular artillery. See Carleton, 'The Battle of Buena Vista' (1848); Howard, 'Gen. Taylor' (1892).

Buenaventura, *bwā-na-vēn-tū'ra*, a seaport of Colombia, on the Bay of Choco, on a small island at the mouth of the Dagua, 200 miles southwest of Santa Fé de Bogota. It is the port of Santa Fé de Bogota, Popayan, and Cali.

Buendia, Juan, *hoo-ān' bwān'de-ā*, Peruvian general: b. Lima, 1814. He was put in command of the Army of the South in the Chilean war in 1879, and attacked 10,000 Chileans on the heights of San Francisco, 8 November, where he was defeated with terrible loss. He was court-martialed, but freed from blame and afterward served in the defense of Lima.

Buenos Ayres, *bwā'nōs ī'rās*, one of the provinces of Argentina, lying west of the La Plata and Atlantic Ocean, and separated from Patagonia by the Rio Negro. The chief rivers are the Parana, with its tributary, the Plata River, and the Rio Salado. The province presents nearly throughout level or slightly undulating plains, known as the pampas of Buenos Ayres. They are covered with tall, waving grass, which affords pasture to vast numbers of sheep, cattle, and horses. These constitute the chief wealth of the inhabitants; and their products, along with wheat, are the chief exports. The climate is generally healthy. For judicial purposes the province is divided into four districts, and for administrative ones into 100. The capital is La Plata. The executive power resides in a governor and vice-governor, indirectly elected for three years, and the legislative power in a Congress, composed of a Chamber of Deputies of 100 members, biennially elected, and a Senate of 50, elected biennially. The Congress sits from 1 May to 31 August. Pop. (1903) about 1,200,000.

Buenos Ayres, the capital of Argentina. It is situated on the right bank of the Rio de la Plata, which is 24 miles wide at this point. Lat. 34° 36' 24.4" S.; lon. 58° 22' W. In 1887 the city limits were extended so as to include the districts of Flores and Belgrano; and this addition to its territory made it one of the most extensive capitals of the world, with an area of 34,829 acres. The first authentic census, taken in 1869, showed the number of the population to be 177,787. In 1887 another census was taken, and there were found to be 404,000 inhabitants, or 432,000 including Flores and Belgrano. By the close of 1893 the population was 600,000, and the rapid increase during the last decade has made Buenos Ayres the leading South American city. In building and public improvements the advance has been equally rapid. In 1869 there were 20,858 houses, of which 1,558 were of wood, and 1,300 had roofs of straw. By 1887 buildings of brick had replaced the most primitive structures, and there were in all 33,804 houses. After 1880, when Buenos Ayres was definitely chosen to be the capital of the nation, it was said that "the number of houses built each year was double the number built in the preceding year," and for a while such was actually the case. A majority of the modern structures are three or four stories high. The suburbs, besides the two already mentioned, are: San Martin, San Isidro, San Fernando, The Tigré, Lomas, Andragué, Temperly, Caballito, and Moron. The street railway system is, in proportion to the population, more extensive than that of any other city. Pop. (1900) 800,951. (For industries, low death rate, new waterworks, drainage system, docks, etc., see ARGENTINA.) See Turner, 'Argentine and the Argentines' (1892).

Buenos Ayres, University of (Universidad Nacional de Buenos Aires), the national university of Argentina and the largest institution of learning in South America. Its students number nearly 2,700, and its courses cover law and government, mathematics, science, and philosophy.

Buff, a mixed color, something between pale pink and pale yellow. It was adopted by the English Whig party, in combination with blue, as their distinctive color; and, possibly in consequence of that circumstance, the Whig party having been opposed throughout to all the measures of government which led to the American Revolution, was chosen as the national uniform of the Americans at the opening of the Revolutionary War.

Buff Leather, a leather prepared by saturating the hides with some aluminous substance, and afterward with oil. Leather prepared in this way is softer and more flexible than any other kind, and on that account it is much used for soldiers' cross-belts, gloves, and other military accoutrements. Its color is naturally light yellow, but it is in some cases bleached before being used. The buff leather used in former times to make the jerkins, worn under coats of mail to deaden the pressure of the metal on the body, and to prevent any contusion from a blow, was made from the hide of the urus, or wild bull of central Europe, the common name of which was *bufe*, whence the name of the leather was derived.

BUFFALMACCO — BUFFALO

Buffalmacco, boo-fal-mäk'kō (assumed name of BUONAMICO CHRISTOFANI), Italian painter who flourished according to Vasari during the first half of the 14th century. The same authority attributes to him the frescoes depicting the Passion in the hall of the Campo Santo in Pisa, and states that he worked in Arezzo, Florence, Bologna, and Cortona. He is mentioned by Boccaccio in the 'Decameron.'

Buffalo Bill. See CODY, WILLIAM F.

Buffalo, N. Y., county-seat of Erie County, the second city in the State and eighth in the United States; situated at the eastern end of Lake Erie and on its outlet the Niagara River. Its centre is 24 miles south of Niagara Falls, and its important suburbs, the Tonawandas, are half-way between. It lies due west 297 miles by rail from Albany and 499 from Boston; northwest 425 miles from New York, and 417 from Philadelphia; about 410 southwest of Montreal; and 540 east of Chicago. It is, therefore, about a midway point from the East to Chicago. It extends about 10 miles along the lake and river front, and half as far east; area, 42 square miles.

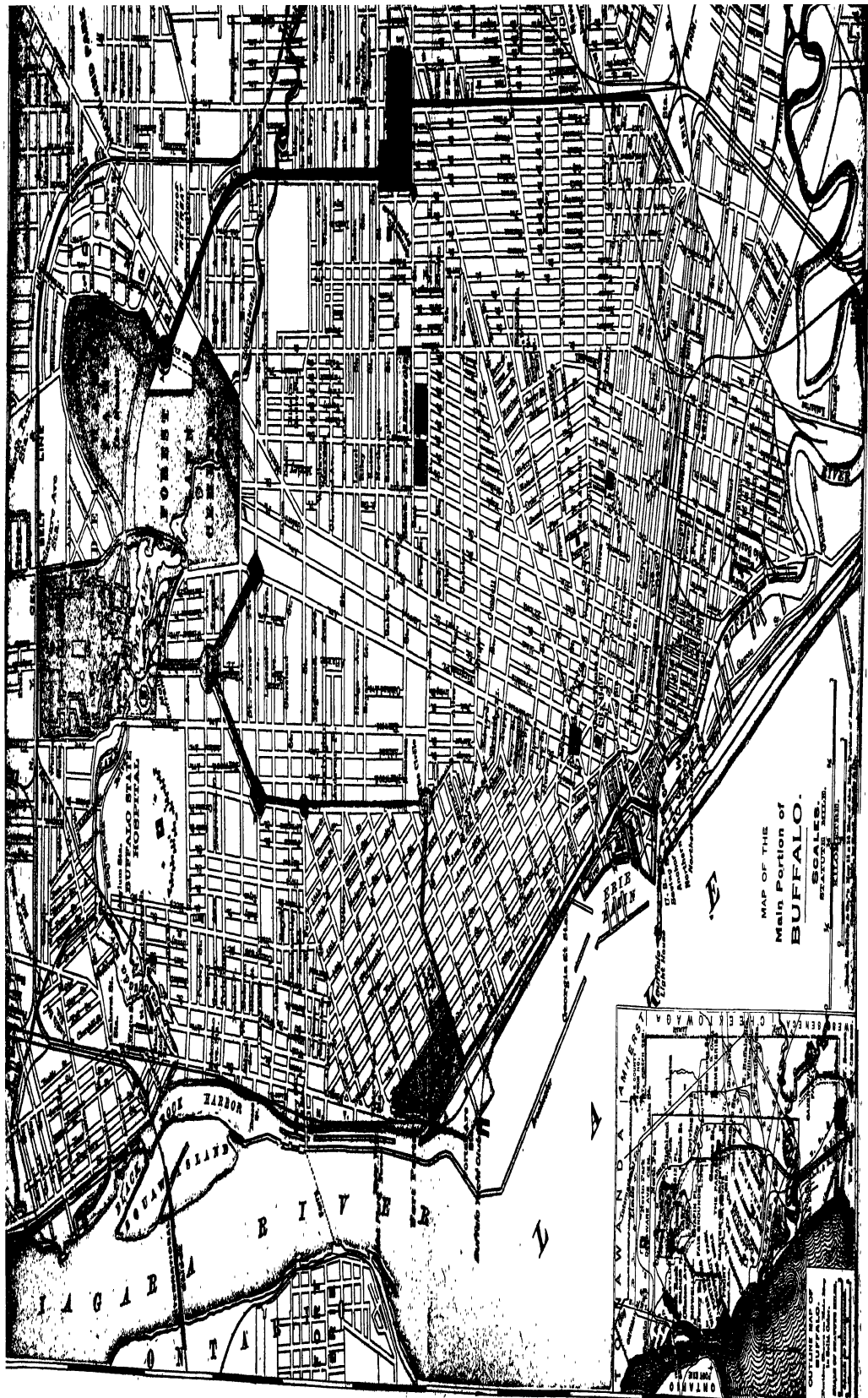
Buffalo, which began at the mouth of Buffalo Creek, has spread mainly north and east up a gradual rise, to a great plateau some 80 feet above the lake and 620 above sea-level. It is laid out in wide rectangular streets, beautifully shaded and decorated with shrubbery, and more completely than any other city in the world: No less than 335 miles of its over 700 miles of streets are asphalted, 105 are stone-paved, and many more are macadamized. The chief business streets are Main, running north and northeast from the lake to the city limits; Delaware Avenue, parallel with it; Niagara, north and northwest along the lake and river front to Tonawanda; and Broadway, which with Genesee and Sycamore widen spoke-like from the heart of the business district around Lafayette and Niagara Squares. Each of these is several miles long. The finest residence streets are Delaware Avenue and North Street, crossing it at right angles a mile north of the centre; they are set with large separate mansions, with great lawns, gardens, and shrubberies, a fashion followed in the new residence streets to the north.

Municipal Service and Improvements.—The street cleaning and sprinkling services, costing \$180,000 a year, and the garbage collection, costing \$110,000, are notably efficient; the sewage collected through over 420 miles of mains is emptied into Niagara River and carried swiftly away; the first public bath house erected in New York State under the law of 1895 was opened here in 1897. All these things, with the cool summer climate which attracts many visitors, enable Buffalo to claim the distinction of being the cleanest and healthiest city in the United States, its death rate in 1900 being 14.8 and in 1901 12.25. The waterworks, built in 1888, are supplied from the lake; they cost \$9,100,000, and are owned by the city; the reservoirs have a storage capacity of 200,000,000 gallons a day, the average consumption is about 100,000,000, and there are over 500 miles of mains; the service costs \$650,000 a year. Electric lighting is almost universal in business houses and the finer residences, from the cheap power furnished by Niagara Falls. The police department numbers 785 men, with 13 stations

and a harbor patrol steamer, and costs nearly \$800,000 a year. The fire department has 26 steam fire engines, 6 chemical engines, and 23 hose companies, with three fire boats, the latest systems of storage and signal boxes, and 498 men; the cost is \$675,000 a year. An important municipal improvement has been the transfer of telegraph and telephone, police, and fire-alarm wires, from overhead poles to subways. The street-car service of Buffalo was the first in the United States to equip itself with electricity, and to give free transfers; it has seven companies, and covers over 200 miles of line, extending to all the suburbs, down the river to Niagara Falls, and across it to Canada. More than 50 miles of the track is in the city, which has also a steam belt line of the N. Y. C. along the lake and river front, and west and north to above Delaware Park.

Public Parks and Cemeteries.—The park system includes six large parks of 1,149 acres in all, connected by a magnificent system of boulevards, parkways, speedways, and approaches, covering 224 acres, and 74 acres of minor places and squares. Much the largest is Delaware Park, on the north side, of 362 acres, with a lake ("Gala Water") of 46½ acres in the western part; here and in the adjacent grounds the Pan-American Exposition of 1901 was held. It is continued by Forest Lawn Cemetery of 239 acres on the south—by far the greatest of the 26 cemeteries of the city, and containing the monuments to the Indian chief Red Jacket and to President Fillmore—and by the fine grounds of the State Insane Hospital, with 203 acres, on the west. On the southeast is Humboldt Park of 56 acres. Overlooking the lake at the river entrance is "The Front," a bold bluff 60 feet high, and the site of Fort Porter, where several companies of United States soldiery are stationed. The Parade Ground here has 48 acres, and is a favorite promenade from its superb view. On the south side of the creek are South Park, 155 acres, Cazenovia Park, 106 acres, Riverside Park, 22 acres, and Stony Point Park, 22½ acres, on the lake front. There are several attractive parks and squares in the centre of the city, among them Lafayette, Niagara, Franklin, Washington, and Delaware. Lafayette contains the Soldiers' and Sailors' Monument, costing \$50,000.

Chief Buildings.—Among the many fine structures in the city, the first place must be given to Ellicott Square, the largest and most magnificently equipped fireproof office building in the world; it occupies an entire block, and contains over 400,000 feet of floor space, or over nine acres, with 16 elevators. Of the others, besides churches, cathedrals, and institutional buildings mentioned elsewhere, the most notable are the two handsome buildings preserved from the Exposition—the Albright Art Gallery, and the New York State Building, housing the Buffalo Historical Society; the new Federal Building, containing the post-office and the custom-house, a large freestone structure which cost \$2,000,000; the city and county hall on Franklin Street, of granite, in the shape of a Latin cross, with a tower 245 feet high, completed in 1880 at a cost of about \$1,400,000; the Music Hall and the Board of Trade building, both noble edifices; the State Arsenal; the Old and New Armories; the Masonic Temple and Y. M. C. A. building; the Grosvenor Library; the



BUFFALO

Normal School and the three High Schools; the Erie County and Buffalo Savings Banks; the Erie County Penitentiary; and the mammoth grain elevators.

Trade and Commerce.—Buffalo's position as the eastern terminal of the commerce of the Great Lakes, and the distributing point from the East to its ports, has made it the greatest city built up on them except Chicago and Cleveland, and one of the great world-ports in the volume and variety of produce trans-shipped, although ice-bound for one third of the year. In 1902, 4,781 vessels arrived at this port, with a gross tonnage of over 6,000,000; and the customs receipts were over \$900,000. Naturally, its foremost handlings are of western produce, grain, flour, provisions, and live stock; its average annual receipts of grain, though varying with the crop, are about 150,000,000 bushels, of flour 14,000,000 barrels. Next to this is its live-stock business; it handles more horses and sheep than any other American port, and ranks among the first in cattle and swine. It receives some 15,000,000 pounds of fish yearly, largely from Georgian Bay off Lake Huron, and sends it to inland parts not only East, but as far west as the Rocky Mountains. Lumber is another immense interest, its receipts amounting from 150,000,000 to 250,000,000 feet a year; and it receives some 1,500,000 tons of iron ore. Of these last two a large part goes to Tonawanda, whose business, however, is really part of Buffalo's. The coal traffic is also enormous: some 10,000,000 tons are received yearly by rail, two thirds anthracite, of which about 3,000,000, nearly all anthracite, is shipped westward by water. About 100,000 tons of salt are among its exports, and nearly \$10,000,000 worth of packed meat. The total export trade is now over \$16,000,000 a year.

This immense development has been made possible by a vast co-operation of United States, State, and municipality in facilities for handling the business—breakwaters, stone piers, basins, canals, railroads, etc. Originally, as with all the lake ports, the harborage was only the shallow mouth of a small river, Buffalo Creek, navigable now for two miles inward. But the government has built a great series of stone and cement breakwaters, four miles long, costing over \$2,000,000, and forming an inner and an outer harbor, the best on the lakes; this is extended to Stony Point, four miles above the mouth of the creek. The State has built Erie Basin, with a breakwater and stone docks, at the end of Erie Canal just below the mouth of the creek; and the city has deepened the creek and built a ship canal two miles long between it and the lake, one of two such, at the end of which are the Lehigh coal docks. No less than 16 steamship and steamboat lines run from Buffalo to different points on the lakes, besides summer excursion routes. The Welland Canal about 20 miles west, across the neck of land between Erie and Ontario, connects it with the latter and the St. Lawrence. The Erie Canal makes a waterway through the heart of the State to the Hudson River. As to railroads, it is the terminal of the main line or some spur of every trunk road from Philadelphia to Quebec: from the east, in the United States, the New York Central, main line and West Shore; Erie; Lehigh Valley; Delaware, Lackawanna & Western; Pennsylvania; Buffalo, Rochester & Pittsburg;

Buffalo & Susquehanna; from the west, the Lake Shore & Michigan Southern; Michigan Central; New York, Chicago & St. Louis; Wabash; from Canada, Canadian Pacific; Grand Trunk; Canada Southern. There are 250 passenger trains a day; 700 miles of railroad track within the city limits, and six of the city's square miles are owned by the railroads. To the Canada side at Fort Erie and Bridgeburg there are several ferry lines, and the great International Bridge from Squaw Island to Bridgeburg, completed in 1873 at a cost of \$1,500,000. The internal conveniences for carrying on this traffic are correspondent. There are nearly 50 grain elevators, fixed and floating and transfer towers, with a storage capacity of 28,000,000 bushels, and able to take care of 5,000,000 bushels a day. Some of these are among the largest in the world: the chief one, the Great Northern, with a capacity of 3,000,000 bushels. The first elevator in the world was built here in 1843. The largest coal pocket in the world is that of the D., L. & W. here, 5,000 feet long; the coal docks can handle 29,000 tons a day; the railroad coal-stocking trestles are in the east part. Their stock yards, 75 acres in extent, are in East Buffalo.

Manufactures.—Two great advantages of Buffalo in manufacturing are natural gas, for which the city has laid mains; and the electric power furnished from Niagara, whose tunnels are within 20 miles. At present, about 50,000 persons are employed in manufacturing industries in the city, in 4,000 establishments. By the census of 1900, the figures were: Establishments, 3,962; capital, \$103,939,655; employees, 476,902; wages paid, \$19,915,817; cost of materials, \$73,359,466; value of products, \$122,230,061. The principal industries apart from food, mason, and carpenter work, tinsmithing and jobbing, etc., were—wholesale slaughtering and meat packing, \$9,631,187; foundry and machine-shop products, \$6,816,057, — but to this should be added iron and steel, architectural and ornamental iron work, and hardware, \$3,685,063, making a total of \$10,501,120, for iron products altogether, or the most important single branch: the Lackawanna Steel Company, capitalized at \$40,000,000, has the largest and most capacious individual plant in the world, with a separate breakwater a mile long and a capacious private harbor—linseed oil, \$6,271,170, partly used in its \$753,519 of paint making; malt and malt liquors, \$6,229,940; railroad cars, \$4,553,333; soap and candles, \$3,818,571; flour and grist-mill products, \$3,263,697; planing-mill products, \$3,095,760; factory-made clothing, \$3,067,723; chemicals, \$1,930,378; patent medicines and compounds, \$1,855,808; leather and leather goods, \$1,756,084; factory-made furniture, \$1,644,671; besides over \$1,000,000 each of carriages and confectionery, and large quantities of jewelry, saddlery and harness, tobacco products, and other articles, embracing some 200 different industries in all. Notice should be taken of fine printing, lithographing, and engraving, in which Buffalo ranks high artistically.

Finances and Banking.—The assessed valuation of the city has increased in 30 years from about \$38,000,000 to over \$250,000,000, nearly all real estate, with a tax rate of 17 1/2. The bonded debt is some \$16,000,000, with an annual interest charge of about \$650,000; but there is a sinking fund of about \$1,250,000, and the city owns property valued at about \$21,000,000. Also,

BUFFALO

of this debt \$3,754,382 is for water bonds, on which an income is earned. The city expenses are some \$6,000,000 a year. The post-office receipts are over \$1,000,000 yearly, and the internal-revenue receipts about \$2,000,000. There are nine banks of discount (five national), with about \$3,000,000 capital and surplus and \$45,000,000 deposits; two trust companies, with \$1,400,000 capital and surplus; and four savings banks, with over \$35,000,000 deposits and \$6,000,000 surplus.

Churches.—Buffalo is the seat of a Roman Catholic and of an Episcopal bishop, and has two handsome and impressive cathedrals; the Catholic cathedral being a Gothic structure of blue stone trimmed with white, and has a set of 42 chimneys. Besides these there are 37 Catholic churches, 13 chapels, and 12 convents; and 171 Protestant, besides 16 missions and chapels, the most numerous being the Methodist Episcopal (24 English, 3 German), Baptist (25 churches and 5 missions), Lutheran (13 German, 5 English, 3 Scandinavian), Presbyterian (18), Protestant Episcopal (16, with 11 missions), and German United Evangelical (15). There are also nine synagogues. Of the church buildings, besides the cathedrals, the most notable are Trinity (Episcopal) and the First Presbyterian.

Charities.—There are 12 children's refuges in Buffalo, and 9 homes and refuges for adults; besides a S. P. C. C. and S. P. C. A., and many religious associations for relieving distress; 18 hospitals, besides the United States Marine Hospital; the Erie County almshouse; lodging and supply stations for the temporary relief of the indigent; a city physician, a district nursing association, and diet kitchens; a German Y. M. A. and the Y. M. C. A.; and a Women's Educational and Industrial Union. Of the children's institutions, the most notable is the free Fitch Institute for poor children, a combined orphanage, crèche—day nursery for children of poor working mothers—training school for nursemaids, etc.; all managed by the Charity Organization Society (organized 1877, the first in the United States), with its home in the building. Of the other institutions, special note may be made of the Buffalo Orphan Asylum, St. John's Orphan Home, the Home for the Friendless, St. Vincent's and St. Joseph's orphanages (Roman Catholic), St. Mary's Asylum for Widows and Foundlings and St. Mary's Institution for Deaf Mutes, the Church Home for Aged Women, and the Ingle-side Home for Erring Women.

Education and Intellectual Associations.—The city in 1903 had 67 grammar schools, with about 100 school buildings, some 1,300 teachers, and an average attendance of about 60,000; a truant school; 33 Catholic parochial schools, with an estimated attendance of some 20,000; two high schools, third one building—the Central with two annexes, and the Masten Park—with attendance of some 2,400; 25 private schools and academies; and some 20 free kindergartens (partly in connection with the schools), orphan-asylum schools, etc. Of the higher institutions, the chief is Buffalo University, organized in 1845, with affiliated law, medical, and dentistry schools, and a cancer laboratory, 80 professors, and 700 students; others are Niagara University, Canisius' (1870) and St. Joseph's Colleges, the Academy of the Sacred Heart and Holy

Angels' Academy (the last four Catholic), the German Martin Luther Seminary (Evangelical Lutheran, 1854), and the Buffalo College of Pharmacy. All the hospitals have training schools for nurses. The Fine Arts Academy (1862) is located in the public library building; the Buffalo Historical Society (1862), with interesting relics and a large library, in the former New York State Building of the Exposition of 1901, now belonging to the society; the Buffalo Society of Natural Science (1861), with a valuable museum of natural history, in the Buffalo Library building. There are many other art and literary associations; 8 dramatic and 13 musical clubs, besides 23 social clubs; and 8 theatres.

Libraries.—The two chief ones are the Buffalo Public Library, installed in a handsome new building in 1897, with about 175,000 books and 16,000 pamphlets; and the Grosvenor, for reference only, with 65,000 books and 4,000 pamphlets. Besides these, there are many institutional, private, and special libraries: the chief being that of the Historical Society, with 12,000 volumes and 23,000 pamphlets; others are the Lord Library of 5,000 volumes in the same building; the State Law Library, with about 15,000 volumes; the Catholic Institute, with over 11,500 volumes and 500 pamphlets; the Medical Library of the University, with 6,000 volumes; the Lutheran and the German Y. M. A., the Polish and the Adam Mickiewicz, the North Buffalo Catholic Association and the St. Michael's Y. M. Sodality, the Erie Railway Employees' Association, the Harugari, etc.

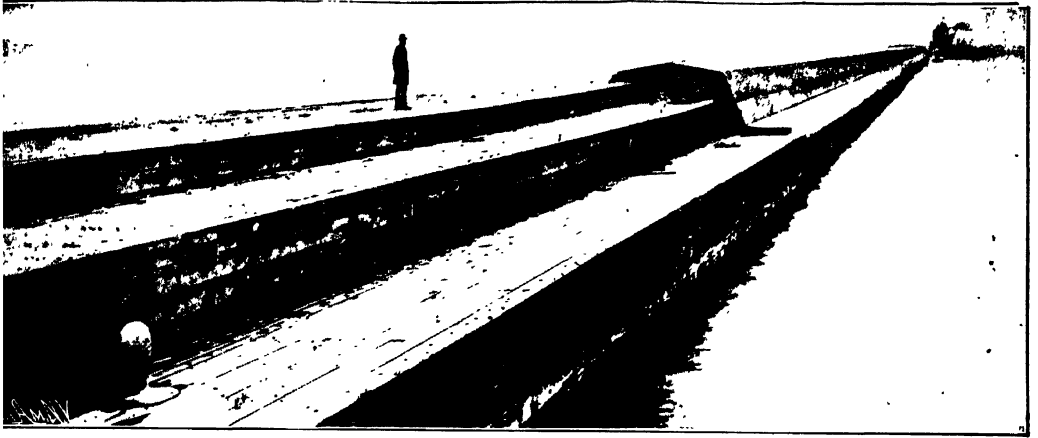
Newspapers.—In 1903 there were published in Buffalo 88 regular periodicals: 11 dailies, 31 weeklies, 6 Sunday, 2 fortnightly, 35 monthly, and 3 quarterly.

Government.—A four-years' mayor; an alderman from each of the 25 wards, and nine councilmen at large; a city clerk appointed by the council, and health, fire, park, police, and civil-service boards appointed by the mayor; the remaining officials elected by the people.

Population.—In steadiness of rapid growth, Buffalo ranks among the foremost of American cities. It first appears in the census in 1820, with 2,095; 1830, 8,668; 1840, 18,213; 1850, 42,261; 1860, 81,129; 1870, 117,714; 1880, 155,134; 1890, 255,664; 1900, 352,387; 1903, about 385,000. It will be noticed that the last 20 years have brought a great increase instead of decrease in its rate of development, and there are no signs of falling off. In 1890 it was eleventh, in 1900 eighth, among our cities; and as it was twin with New York for third in rate of growth among cities of 300,000 and over, it may rise higher yet. The foreign-born population numbered 104,252, or 29.6 per cent; the native-born of foreign parents, 155,716; and only 90,860 of its people, or little over one fourth, were native whites of native parentage. Of the foreign-born, about 50,000, or nearly half, were German, 13,000 being Polish-German Jews; 11,000 were Irish; but 23,400 were Englishmen from England or Canada, which should be added to the citizenship of English blood. In 1878, of all children born in the city, 1,975 were of German descent, against 2,056 of all other descents.

History.—The site of Buffalo was originally a basswood forest, amid which an Indian tribe, the Kawkwas, between the Neutrals and the Eries, hunted and fished along the creek; it was

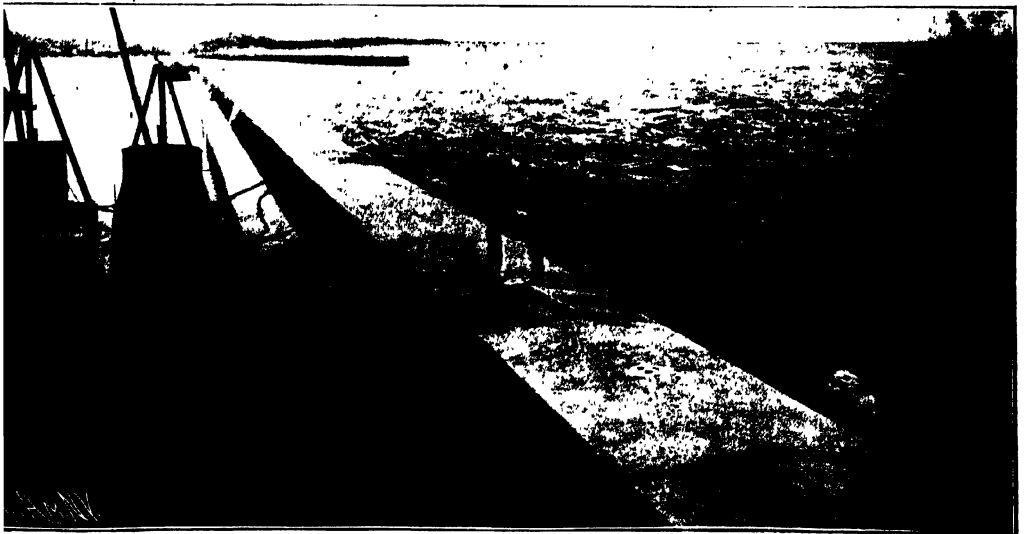
BUFFALO BREAKWATER.



ORIGINAL CRIB SUPERSTRUCTURE IN FOREGROUND, CONCRETE RECONSTRUCTION IN DISTANCE.



STONE BREAKWATER, SHOWING TOP ANGLE STONES.



THE COMPLETED CONCRETE BREAKWATER.

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BUFFALO

exterminated by the Iroquois before 1651, and not a single Indian lived there again for more than a century and a quarter. In 1679 La Salle passed the spot in his 60-ton sloop the Griffin, the first sailing vessel ever on Lake Erie, built at Cayuga Creek below. In 1687 the Baron La Hontan recommended it to the French government as the proper site for a fort to command the fur trade down the Niagara, and marked a "fort suppose" on his map; but no attention was paid to him. In 1764 Col. Bradstreet built Fort Erie across the river on his Indian campaign. In 1780 the Senecas, driven from their old haunts by Sullivan's campaign, settled along the creek inland; the next winter an English family captive among them heard them call the creek by a name they translated "Buffalo,"—whether rightly or not is disputed, but probably enough the herds had sought the salt-licks to the east. Their narrative was published in 1784, and in the treaty of Fort Stanwix that year between the English and the Iroquois, the name was used as familiar to the latter. The Indian settlement soon became known as "the village on the Buffalo," currently shortened to "Buffalo village," and presently to "Buffalo," without any official sanction. The land had formed part of the grant of James I. to the Plymouth Company in 1625, and that of Charles II. to the Duke of York in 1664. The consequent dispute between Massachusetts and New York was compromised in 1786, and ultimately the Holland Company of aliens became patentees in trust in 1792, and by legislative permission owners in fee in 1798. Meantime a few settlers had straggled in; a trader named Cornelius Winne in 1789; two families in 1794 and 1796; and in 1797, when there were half a dozen houses, the first white child was born, a girl. A number of others took up residence there by 1803. In that year, by the advice of their surveyor, Joseph Ellicott, the founder of Buffalo, who had assisted his brother Andrew in laying out the city of Washington, and was convinced that here was the site of another great city, the company had him plot a village, and in 1804 sold the first lots. He called it New Amsterdam, and named the streets after the members of the company, but the settlers disregarded all his names and his oxbow line for Main Street, where his own mansion was to be. In 1810 the town of Buffalo was incorporated, including several now separate townships. In 1811 the first newspaper, the *Buffalo Gazette*, was established. In 1813 Buffalo village was incorporated, and received a new charter in 1822. In the War of 1812, after the storming of Fort Niagara by the British in December, a force of British and Indians under Gen. Riall was detailed to destroy Black Rock and Buffalo; on the 29th captured the latter, and the next day burned all but seven or eight houses, coming back 1 January and burning all but three of the rest. The settlers re-occupied their homes to some extent on the 6th, but it was not generally rebuilt till 1815; on 10 April 1814 Gen. Scott put it under military rule. In 1818 the first steamer, Walk-in-the-Water, was launched. For many years, however, supremacy was balanced between it and Black Rock down the river, now the northern part of the city, where at that time was the ferry across the Niagara to the Canada side; but in 1825, after a fierce struggle, the former secured the terminal of the Erie Canal, and in five years

its 2,412 inhabitants had grown to over 8,000, and its future was assured. Long after, however, able capitalists invested heavily in Dunkirk, 48 miles south, in faith that it and not Buffalo was the coming lake port. In 1832, it became a city, and the next year it annexed Black Rock. Buffalo has given two Presidents to the United States, Millard Fillmore and Grover Cleveland, the latter its mayor in 1882. From 1 May to 1 Nov. 1901, the Pan-American Exposition was held here, and on 6 September President McKinley was shot while attending it.

See publications of the Buffalo Historical Society; Smith, 'History of the City of Buffalo and Erie County' (1884); Ketchum, 'History of Buffalo' (1864-5); Powell, 'Historic Towns of the Middle States' (1899).

EDWARD H. BUTLER,
Editor Buffalo Evening News.

Buffalo, a name frequently misapplied to the American bison, but more properly designating a type of heavy oxen, of the tropics of the Old World, long domesticated in the Orient. Buffalo are characterized by their long, angulated horns, broad and flat at the base, so as to form in some cases a shield over the forehead; and by their broad, splay feet, particularly adapted to wading in muddy waters, where they mainly feed on aquatic grasses and other plants. There are three distinct species.

The largest and fiercest buffalo is the black "cape," or South African species (*Bos capensis*) found throughout the entire south of Africa, northward to Abyssinia. It reaches a length of six feet, and in old bulls the relatively short horns join at their bases, so as to form a helmet-like mass, which makes the head almost invulnerable. The horns curve "outward, downward, and backward, and then forward, upward, and inward." This buffalo is bluish-black, and nearly hairless. Its chief enemies are the lion and man, whose combined efforts have greatly decreased its numbers. The buffalo are warned of the approach of danger by the buffalo-birds (q.v.), which constantly hover near them. Another species (*B. pumilus*) is widely scattered throughout the west, and central parts of Africa. It is smaller than the more southern species, and is chestnut in color. The most widely domesticated of the buffalo is that of India (*B. bubalus*), called "arni" (feminine "arna") by the Hindu. It differs greatly in appearance from the African species, having a cow-shaped head, and long, much flattened, triangular horns, covered with transverse wrinkles, which curve regularly outwards and backwards towards the shoulder, and do not form a buckler over the forehead. The bull is ashy-black in color, frequently with white feet, and is smaller than the African buffalo, never exceeding 16 hands at the withers. It is in the wild state an animal of tremendous power and ferocity, and is regarded by sportsmen as one of the most dangerous beasts of the jungle. It has long been employed in the rice-fields of the Orient, as far east as Japan; the ordinary "water-buffalo" or "carabao" of the Philippines is a small variety. It was long ago introduced into Egypt for service in the boggy lowlands of the Delta, and is now extending up the Nile to the lake regions of central Africa. A variety exists in the Niger valley, and another, called "sanga," and distinguished by its very long horns, is do-

BUFFALO-BIRD — BUFFALO HISTORICAL SOCIETY

mesticated in Abyssinia. The Indian buffalo is also employed in marshy farming districts in Turkey, Hungary, Italy, and Spain, where it is able to work in ground too wet and soft for the other cattle, and to pasture upon coarse, marshy grasses. Its hide makes good leather, and its milk is excellent, and is greatly used in India for the making of the semi-fluid butter called "ghee."

Buffalo-bird, any of several birds which remain about cattle, and feed upon their parasites. Most of them are starlings (q.v.) of plain dark plumage, with the habit of gathering into noisy flocks. Those of South Africa, almost always seen in company with buffalos and rhinoceroses, belong to the genus *Buphaga*, and are commonly termed "ox-peckers," "beef-eaters," or "rhinoceros-birds." They cluster upon the backs of these animals while they rest or slowly feed, and pick from them ticks and similar pests; and they also serve as watchmen for their hosts, arousing them by their cries whenever anything suspicious happens.

Buffalo Bug. See CARPET BEETLE.

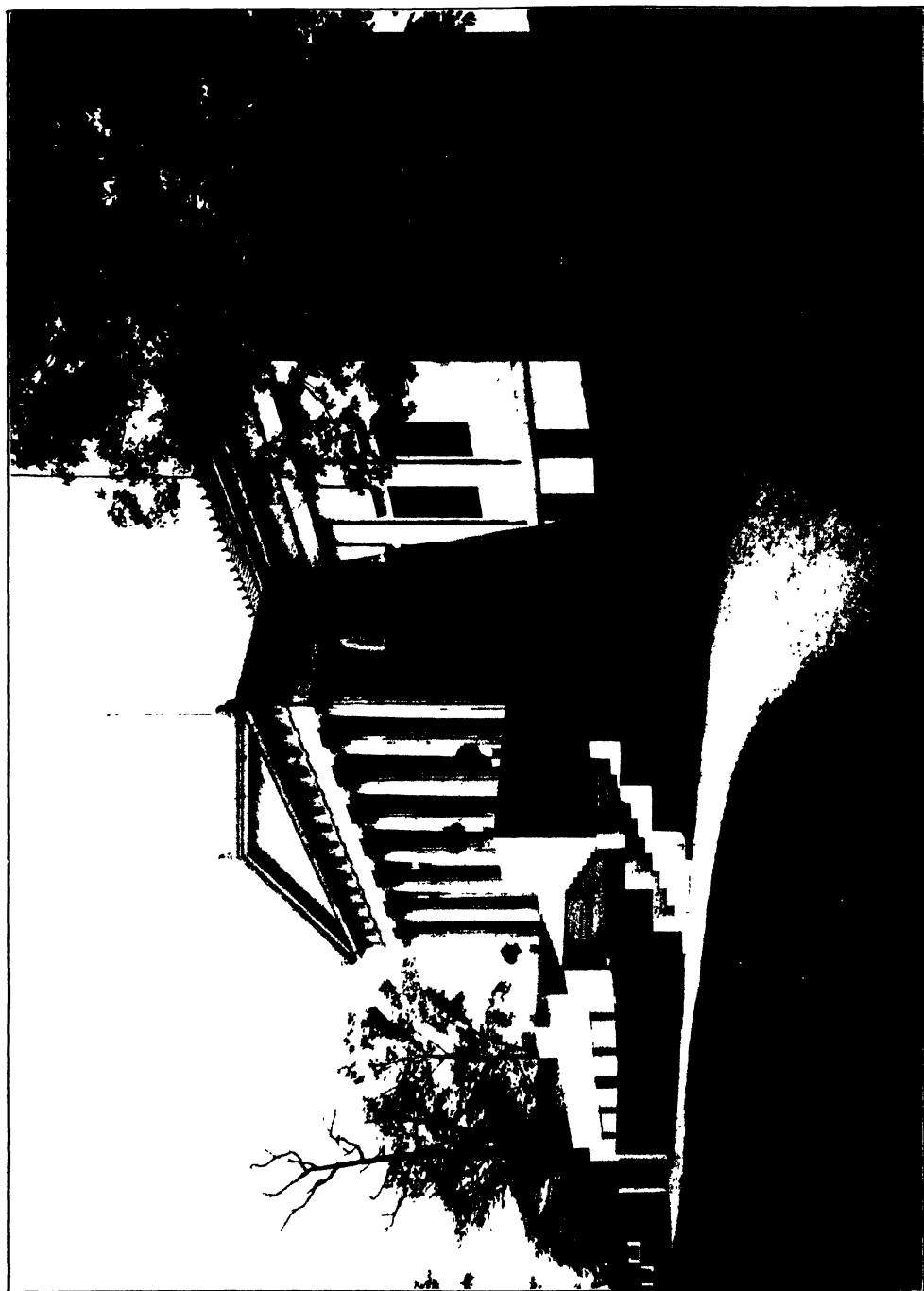
Buffalo-fish, a large, coarse, fresh water fish of which there are four varieties; three inhabiting the waters of the Mississippi valley, and one the river Usumacinto in Mexico. The formation of the head suggests the name, for from the nose to the top of the shoulders it has the high, humpy pitch of the bison. In Louisiana they are known as "gourdheads." The common big-mouthed buffalo-fish (*Ictiobus cyprinella*) reaches a length of three feet and a weight of 50 pounds. In the spring freshets of the Mississippi valley at spawning time, it swims in great shoals on to the flooded marshes, where the receding waters make it an easy victim to the farmers, who kill great numbers of them for fertilizers. In body they are stout and of a dull, brownish-olive hue, not silvery, with dusky fins. The black, or mongrel, buffalo-fish (*I. urus*) has a smaller, more oblique mouth, and a much darker color; the fins being almost black. The small-mouthed, or white, buffalo-fish (*I. bubalus*) is the most abundant. It does not run so large as the common buffalo, 35 pounds being its limit. In color it is pale, almost silvery. See Jordan and Evermann, 'American Food and Game Fishes.'

Buffalo-gnat, a fly allied to the black-fly (q.v.), *Simulium pecuarum*, of the family *Simuliidae*, order *Diptera*, a larger and more formidable species than the black-fly of the northern and subarctic regions. It attacks in the lower Ohio and the Mississippi valley various domestic cattle, horses, sheep, poultry, dogs, and cats, and is especially hurtful to mules and horses, killing many. Hogs show at first the effects of the bite but very little; yet large numbers die soon after the attack, while others die about six weeks after the disappearance of the buffalo-gnats; they usually perish from large ulcerating sores, which cause blood-poisoning. Animals of various kinds become gradually accustomed to these bites, and during a long-continued invasion but few are killed toward the end of it. As a rule, gnats may be expected soon after the first continuous warm weather in early spring. See GNATS.

Buffalo Historical Society, Buffalo, N. Y. Foremost among institutions of its kind west

of New England and the older Atlantic seaboard cities is the Historical Society of Buffalo, N. Y. Founded in the spring of 1862, Millard Fillmore was its first president; and it was at his suggestion that 50 citizens of Buffalo agreed to pay \$20 each per year for five years, thus founding the first maintenance fund of the institution. In President Fillmore's inaugural address, 2 July, 1862, the principal objects of the society were stated to be to "discover, procure and preserve whatever may relate to the history of Western New York in general, and of the City of Buffalo in particular." For many years the society occupied various leased quarters with its small museum and library, and its progress was slow; but throughout its more than forty years of existence it has always included among its members the most substantial and representative families of Buffalo. From 1887 to 1902 the society occupied rooms in the Buffalo Public Library building. The need of a building of its own had long been apparent. The nucleus of a building fund had been formed by a gift of \$5,000 from the Hon. James M. Smith, and various building projects had been under consideration, when, in 1900, legislation incident to the construction at Buffalo of a building for New York State at the Pan-American Exposition, opened the way for securing a permanent and worthy home for the society. Through the efforts of Senator Henry W. Hill, aided by Wilson S. Bissell, Andrew Langdon and others, a bill was enacted which enabled the State to expend \$100,000, out of its exposition appropriation of \$300,000, toward the erection of a permanent building, and also providing for adding thereto \$25,000 from the City of Buffalo, and funds from the Historical Society; said building to be placed on park lands, and at the close of the exposition to become the property of the Historical Society, the city being bound to make an annual appropriation toward its maintenance. Under this agreement a building was erected in Delaware Park, at a cost of some \$200,000. The only permanent building connected with the Pan-American Exposition, it has the added interest of being the scene of President McKinley's last public reception, 5 Sept. 1901, prior to that held the next day in the Temple of Music at which he received the wound from which he died, 14 Sept.

The Historical Society building stands in a beautiful and easily accessible site in Delaware Park, the principal park of Buffalo. It is 130 by 80 feet in dimensions, 50 feet high, perhaps the most notable example in America of the pure Doric order of architecture. It is of white marble, the northern facade faced with three-quarter columns, the south side having a portico 61 by 17 feet, embellished by 10 Doric columns and approached by marble steps 40 feet in width. The columns are of the same proportion as those of the Parthenon, 3 ft. 6 in. in diameter at the base. Within, the chief structural material is black marble. Situated on sloping ground, the edifice has three available floors, the basement being for the most part but little below the ground level. In the middle of the main floor is the grand hall, two stories high, and lighted, as is the upper floor, by side windows and skylights. The library, lecture hall and administrative offices are on the main floor, the museums and portrait galleries above. A



BUILDING OF THE BUFFALO HISTORICAL SOCIETY.

BUFFINGTON — BUFFON

notable feature of the building is the massive bronze doors, presented by Andrew Langdon; the design by J. Woodley Gosling, the sculptural work by R. Hinton Perry; the principal panels bear female figures typifying "History" and "Ethnology," the bronze transom containing a group showing "Science" and "Art." In the Central Hall is a bronze statue of Lincoln, Charles H. Niehaus, sculptor, a gift to the Society from the Lincoln Birthday Association of Buffalo, now affiliated with it.

Notable features in the museum include the Dr. James coin collection, valued at \$15,000; the Dr. Jos. C. Greene collection of Egyptian and oriental articles, casts, etc.; the Cottier, Scoville and other Indian collections, the Atkins Alaska collection; the Civil War and Lincoln collection of Julius E. Francis, founder of the Lincoln Birthday Association; and many relics of the pioneer days in Western New York, and on the Great Lakes. Many articles formerly belonging to President Millard Fillmore are here shown, as are relics of Lincoln, Grant, other Presidents and famous men.

The Historical Society library (13,000 volumes, 8,000 pamphlets) is a free reference library. It includes the special collection known as the Dr. John C. Lord library, owned by the City of Buffalo but cared for by the Historical Society; and the private library of Mrs. Millard Fillmore. The Society is also rich in manuscript material, which is being drawn on for its annual volume of publications (Vol. V, 8vo, pp. 546, 1902.) Besides its meetings, lectures and receptions for members, the Society makes its possessions and facilities available free to the public, by means of popular lectures in its own lecture hall on Sunday afternoons, talks and various exercises for clubs and school classes, etc., the aim of the management being to make it as useful as possible to the community. It has a membership of upwards of 700, of which 410 are resident, paying \$5 per year, 140 life members, fee \$100, the rest honorary and corresponding.

ANDREW LANGDON,
President Buffalo Historical Society.

Buffington, Adelbert Rinaldo, American military officer: b. Wheeling, W. Va., 22 Nov. 1837. He was graduated at the United States Military Academy in 1861; entered the ordnance department; was promoted colonel in 1889, and became chief of ordnance with the rank of brigadier-general, 5 April 1899. He had command of the National Armory in 1881-92; is the inventor of a magazine firearm, carriages for light and heavy guns, and parts of models of 1884 Springfield rifles.

Buffon, George Louis Leclerc, zhòrzh loo-è le-klàr bu-fon (COMTE DE), French naturalist of distinction: b. Montbard, Burgundy, 7 Sept. 1707; d. Paris, 16 April 1788. He received from his father, Benjamin Leclerc, counselor to the parliament of his province, a careful education. Chance connected him at Dijon with the young DuRoi of Kingston, whose tutor, a man of learning, inspired him with a taste for the sciences. They traveled together through France and Italy, and Buffon afterward visited England. In order to perfect himself in the language without neglecting the sciences, he translated Newton's 'Fluxions,' and Hales' 'Vegetable Statics.' After some time he pub-

lished some works of his own, in which he treated of geometry, natural philosophy, and rural economy. He laid his researches on these subjects before the Academy of Sciences, of which he became a member in 1733. The most important were on the construction of mirrors for setting bodies on fire at a great distance, as Archimedes is said to have done, and experiments on the strength of different kinds of wood, and the means of increasing it, particularly by removing the bark of the trees some time before felling them. Buffon, in his earlier years, was animated only by an undefined love of learning and fame, but his appointment as superintendent of the Royal Garden (now the Jardin des Plantes), in 1739, gave his mind a decided turn toward that science in which he has immortalized himself. Considering natural history in its whole extent, he found no works in this department but spiritless compilations and dry lists of names. There were excellent observations indeed on single objects, but no comprehensive work. Of such a one he now formed the plan, and to aid him in this, by examining the numerous and often minute objects embraced in his plan, he associated himself with Daubenton, and after an assiduous labor of 10 years, the two friends published the three first volumes of the 'Natural History'; and, between 1749 and 1767, twelve others, which comprehend the theory of the earth, the nature of animals, and the history of man and the viviparous quadrupeds. The most brilliant parts of them, the general theories, the descriptions of the characters of animals, and of the great natural phenomena, are by Buffon. Daubenton limited himself to the description of the forms and the anatomy of the animals. The nine following volumes, which appeared from 1770 to 1783, contain the history of birds, from which Daubenton withdrew his assistance. Buffon published alone the five volumes on minerals, from 1783 to 1788. Of the seven supplementary volumes, of which the last did not appear until after his death in 1789, the fifth formed an independent whole, the most celebrated of all his works. It contains his 'Epochs of Nature,' in which the author, in a style truly sublime, and with the triumphant power of genius, gives a second theory of the earth, very different from that which he had traced in the first volumes, though he assumes at the commencement the air of merely defending and developing the former. This great labor, with which Buffon was occupied during 50 years, is, however, but a part of the vast plan which he had sketched, and which has been continued by Lacépède in his history of the different species of cetaceous animals, reptiles, and fishes, but has remained unexecuted as far as regards the invertebrate animals and the plants. There is but one opinion of Buffon as an author. For the elevation of his views, for powerful and profound ideas, for the majesty of his images, for noble and dignified expression, for the lofty harmony of his style in treating of important subjects, he is perhaps unrivaled. His pictures of the sublime scenes of nature are strikingly true, and are stamped with originality. The fame of his work was soon universal. It excited a general taste for natural history, and gained for this science the favor and protection of nobles and princes. Louis XV. raised the author to the dignity of a count, and D'Argenville

BUFFOON — BUG

liers, in the reign of Louis XVI., caused his statue to be erected, during his life, at the entry of the Royal Cabinet of Natural Curiosities, with the inscription "Majestati naturæ par ingenium." The opinions entertained of Buffon as a natural philosopher and an observer have been more divided. Voltaire, D'Alembert, Condorcet, have severely criticised his hypotheses and his vague manner of philosophizing from general views. But although the views of Buffon on the theory of the earth can no longer be defended in detail, he will always have the merit of having made it generally felt, that the present state of the earth is the result of a series of changes which it is possible to trace, and of having pointed out the phenomena which indicate the course of these changes. His theory of generation has been refuted by Haller and Spallanzani, and his hypothesis of a certain inexplicable mechanism to account for animal instinct is not supported by facts; but his eloquent description of the physical and moral development of man, as well as his ideas on the influence which the delicacy and development of each organ exert on the character of different species of animals, are still of the highest interest. His views of the degeneracy of animals, and of the limits prescribed to each species by climates, mountains, and seas, are real discoveries which receive daily confirmation, and furnish to travelers a basis for their observations, which was entirely wanting before. The most perfect part of his work is the 'History of Quadrupeds'; the weakest, the 'History of Minerals.' Buffon was of a noble figure, and of great dignity of manners. His conversation was remarkable for a simplicity which strikingly contrasted with the style of his writings. The best edition of his 'Natural History' is that published from 1749 to 1789, in 36 volumes.

Buffoon (Italian Buffone), a comic singer in the opera buffa, or the Italian intermezzo. The Italians, however, distinguish the buffo cantante, which requires good singing, from the buffo comico, in which there is more acting. Buffoonery is the name given to the jokes which the buffoon introduces. The word is no doubt borrowed from the Low Latin, in which the name buffo (cheeked) was given to those who appeared on the theatre, with their cheeks puffed up, to receive blows on them, and to excite the laughter of the spectators. Afterward the name came to signify a mimic, a jester in general.

Bufo, bū'fō, a genus of batrachians, the type of the family *Bufonida*. The body is inflated, the skin warty, the hind feet of moderate length, the jaws without teeth, the nose rounded. At least 20 species are known.

Bu'fonite, literally, toad-stone; a name given to the fossil teeth and palatal bones of fishes belonging to the family of *Pycnodonts* (thick teeth), whose remains occur abundantly in the Oolitic and Chalk formations. The term bufonite, like those of serpents' eyes, batrachites, and crapaudines, by which they are also known, refers to the vulgar notion that those organisms were originally formed in the heads of serpents, frogs, and toads.

Buford, John, American soldier: b. Kentucky, 1825; d. Washington, D. C., 16 Dec. 1863. He was graduated at West Point in 1848; was appointed to the 1st Dragoons, and served in the Sioux expedition, 1855, in the Kansas disturb-

ances of 1856-7, and in the Utah expedition, 1857-8. On 12 Nov. 1861 he was appointed major in the inspector-general's corps, attached to Gen. Pope's staff, 26 June 1862, made a brigadier on 27 July, and commanded a cavalry brigade under Hooker in the northern Virginia campaign. He was chief of cavalry in the Maryland campaign, and succeeded Gen. Stoneman on McClellan's staff. He took part in the engagement at South Mountain, Antietam, Fredericksburg, and Beverly Ford; and at Gettysburg began the attack before Reynold's arrival on 1 July, and rendered important services at Wolf's Hill and Round Top. After the engagement at Culpeper he pursued the enemy across the Rapidan, and cut his way to rejoin the army north of the Rappahannock. His coolness, fine judgment, and splendid courage were notable, and in a few months he acquired an influence over men as remarkable as it was useful. His military sagacity was far-reaching and accurate, and made him one of the most trusted and respected officers in the service, and his death, caused by disease contracted during months of active service and constant exposure, was widely lamented in the army. A major-general's commission reached him the day he died, and a monument to his memory was placed on the Gettysburg battlefield in 1895.

Buford, Napoleon Bonaparte, American soldier: b. Woodford County, Ky., 13 Jan. 1807; d. 28 March 1883. He was graduated at West Point, 1827, did garrison duty in Virginia and Maine as second lieutenant in the 3d Artillery, and was assistant professor of natural and experimental philosophy at the military academy, 1834-5, when he resigned his commission, became an engineer in the service of the State of Kentucky, 1835-42, and a merchant and iron founder at Rock Island, Ill., 1843-61, being president of the Rock Island & P. Ry., 1857-61. He entered the Civil War as colonel of the 27th Illinois Volunteers, took part in the battle of Belmont, 7 Nov. 1861, the attack on Island No. 10 in the Mississippi River, March-April 1862, captured Union City, Ky., 31 March 1862, took part in the expedition to Fort Pillow, the siege and battle of Corinth, and the siege of Vicksburg, February 1863. On 24 Aug. 1865, he was mustered out of service with the rank of brevet-major-general of volunteers, conferred for gallant and meritorious services during the Rebellion. He was special commissioner of Indian affairs during 1868, and for inspecting the Union Pacific Railroad, 1867-9. During the negotiations after the battle of Belmont the Confederate Gen. Leonidas Polk wrote of Buford, whom he had known at West Point: "He is as good a fellow as ever lived and most devotedly my friend—a true Christian, a true soldier, and a gentleman every inch of him."

Bug, an insect of the order *Hemiptera*. Bugs are characterized by the beak-like sucking mouth-parts, composed of the mandibles and maxillæ, which are ensheathed by the large expanded labium; by the free, large prothorax, the usually angular short body, and the irregularly veined wings, the veins being but few in number, while the fore wings are often half coriaceous and thick. The metamorphosis is incomplete. There are many wingless parasitic forms, and many aquatic species.

The triangular head is nearly always sunken into the prothorax, and is small in proportion to the rest of the body; the eyes are small, nearly globular, and very prominent, and the three ocelli are set far back, while the short, bristle-like, or filiform antennæ, with from 5 to 13 or more joints, are inserted below and far in advance of the eyes, so that the front is broad and flat. The parts of the mouth form a four-jointed, solid, hard beak. The mandibles and maxillæ are long and style-like, the latter with out palpi; they are ensheathed at their base by the canalicular labium, which has obsolete palpi. The labium is well developed, being generally acutely triangular. The thorax is like that of beetles, the prothorax being broad above, and the wings, when folded, concealing the rest of the body. The legs are situated close together, with coxæ and trochanters very similar to those of the *Coleoptera*. The body is usually very flat above, or, in the more or less cylindrical species, somewhat broad and flat. The body is less concentrated headwards than in the *Coleoptera*, though much more so than in the *Orthoptera*, and in this respect, as well as in other essential characters, the group is intermediate between these two orders. Both pairs of wings are very equal in size and alike in shape, except in the higher families, where they are very unequal, the hinder pair being very small.

The legs are slender, and often very long, owing to the great length of the femora and tibiæ, while the tarsi, like those of the lowest *Coleoptera*, are two- or three-jointed. The abdomen has six to nine segments apparent, though the typical number is 11. The stigmata are very distinct, being often raised on a tubercle. On the basal ring of the abdomen are two cavities in which are sometimes seated vocal organs, as in the male cicada, and in the metathorax of some species are glands for secreting a foul odorous fluid. In the *Cicadida* and *Phytocoris* the ovipositor is perfect and much as in the saw-flies and wasps.

The active nymphs of the *Hemiptera*, like those of the locusts, resemble closely the imago, differing mainly in possessing the rudiments of wings, which are acquired after the second molting. After two changes of skin (four in all) they assume the pupa state, which differs mainly from that of the larva in having larger wing-pads. While the development of the imago ordinarily occupies the summer months, in the *Aphides* it takes but a comparatively few days, but in the 17-year cicada as many years as its name indicates. An exception to this mode of development is seen in the nymph of the male coccus, which, somewhat as in the higher orders, spins a silken cocoon, and changes into an inactive pupa. Apteroous individuals, especially females, sometimes occur, especially in the aquatic *Hydrometra*, *Velia*, and *Limnobates*, and in many other genera the hind pair of wings are often absent. There are about 50,000 species living and fossil. Some species are of great size, especially the *Hydrocores*, a division containing the aquatic genera, *Velia*, *Nepa*, *Belostoma*, and *Notonecta*, and which first appeared in the Jurassic formation. But the oldest known fossil insect (*Protocimex silurica*) was apparently a bug; traces of one wing having been found in the Upper Ordovi-

gian beds of Sweden. Consult: Packard, 'Guide to Study of Insects' (1889); 'Entomology for Beginners' (1899); Comstock, 'A Manual for the Study of Insects' (1895); Sharp, 'Insects' (1899).

Bug, two rivers in European Russia. One rises near the confines of Volhynia, in the northwest of government Podolsk, and proceeds first east and then southeast to Olviopol, where it enters government Kherson, which it traverses almost centrally from north to south, and falls into the estuary of the Dnieper, near Kherson. Its chief affluents are the Ingul, Balta, Tchernai, and Solonicha. It has a course of 500 miles, but its navigation is greatly obstructed by rocks and sandbanks. The second river rises in Galicia and joins the Vistula at the fortress of Novogeorgiesk, about 20 miles north-northwest of Warsaw. It is navigable for nearly 300 miles.

Bugason, boo-ga-sōn', Philippines, a town on the island of Panay. Pop. (1900) about 15,000.

Bug/bane, a genus of herbs (*Cimicifuga*), of the natural order *Ranunculaceæ*, tall, perennial plants, of which some 10 species are natives of the northern temperate regions, and are often planted, in spite of their disagreeable odor, for ornamental purposes in hardy borders in exposed places or in partial shade. The species have large decomposed leaves, and racemes of white flowers, which appear during summer and early autumn. In some species the fruits are attractive in appearance. One species, black cohosh, or black snakeroot (*C. racemosa*) is used in domestic and rural medicine as an infusion for various ailments.

Bugeaud de la Piconnerie, Thomas Robert, tō-ma rō-bâr bu-zho-dè-lā-pē-kōn-è-rē (Duc d'Isly), marshal of France: b. Limoges, 15 Oct. 1784; d. Paris, 10 June 1849. He belonged to an Irish family which had settled in France with James II. on his abdication. He entered the army in 1804 as a grenadier, was corporal at Austerlitz, made the campaigns of Prussia and Poland, and was wounded at Pultusk in 1806. He afterward went into Spain as lieutenant adjutant-major, gained new promotion, and remained with the army of Aragon till 1814. During these long wars he repeatedly distinguished himself, and received honorable mention from Suchet, his commander-in-chief. On the restoration of the Bourbons he gave in his adhesion to them; but on the landing of Bonaparte, followed the general example by deserting to his old master. After the revolution of 1830 he was appointed *maréchal de camp*, and in 1831 obtained a seat in the Chamber of Deputies, where he often displayed great good sense, though in a style of oratory so blunt and rustic as occasionally to excite the risibility of his opponents. He was afterward sent to Algeria, where he gained many advantages over the Arabs, and showed himself possessed of the kind of talents necessary to cope successfully with them and their celebrated leader, Abd-el-Kader. On the revolution of 1848, it is said that, if permitted, he would have effectually put down the insurgents and secured the throne to Louis Philippe. He gave in his adhesion to the republic, but re-

BUGENHAGEN — BUGLOSS

mained unemployed. He was better received by President Louis Napoleon, who appointed him commander-in-chief of the army of the Alps.

Bugenhausen, Johann, called POMERANUS, yō'han po-mer-an'ūs boo-gēn-hā'gen, or DOCTOR POMMER, German reformer: b. Stettin, 1485; d. Wittenberg, 20 April 1558. He fled from his Catholic superiors to Wittenberg in 1521, where he was made, in 1522, professor of theology. Luther derived assistance from his profound exegetical learning in preparing his translation of the Bible. In 1525 he gave occasion for the controversies about the sacrament, by a work against Zwinglius on the communion. He acquired more reputation by his 'Interpretatio in Librum Psalmorum' (1523). He effected the union of the Protestant free cities with the Saxons, and introduced into Brunswick, Hamburg, Lubeck, Pomerania, Denmark, and many other places, the Lutheran service and church discipline. For the Lower Saxons he translated the Bible into Low German (1533). He was a faithful friend to Luther, and delivered his eulogy. Together with Melanchthon, he composed the 'Interim of Leipsic.' He wrote also a 'History of Pomerania.'

Bugg, Lelia Hardin, American author: b. Ironton, Miss. She graduated from the Ursuline Academy, Arcadia, Mo., and continued her studies at Trinity College, Washington. She has written: 'The Correct Thing for Catholics' (1893); 'A Lady' (1894); 'Correct English' (1895); 'Orchids: a Novel' (1896); 'The Prodigal's Daughter' (1898); 'The People of Our Parish' (1899).

Bugge, bûg-gē, Elseus Sophus, Norwegian philologist: b. Laurvig, 1833. After obtaining an education at the universities of Christiania, Copenhagen, and Berlin he was made professor of comparative philology and Old Norse, at Christiania, the first to fill that chair. He is the most eminent authority on northern languages and among his works are an edition of the songs of the Edda, 'Norroen Fornkvoedi' (1867); 'Gamle norske Folkeviser' (1858); 'Norroene Skrifter af sagnhistorik Indhold' (1864-73); and a notable edition of the Volunga and Hervarar sagas.

Bugge, Thomas, Danish astronomer: b. Copenhagen, 12 Oct. 1740; d. 15 June 1815. After Tycho de Brahe, he was the greatest astronomer of Denmark. First officiating as professor, he afterward spent most of his time in traveling abroad, and was sent to Paris in 1798 to confer with the commission of the French institute on the subject of the introduction of uniform weights and measures, on which occasion he was made a member of that learned body.

Buggy, a name given to several species of carriages or gigs: In the United States, a light one-horse four-wheeled vehicle, with or without a hood or top; in India, a gig with a large hood to screen those who travel in it from the sun's rays; in England, a light one-horse two-wheeled vehicle without a hood.

Bugiardini, Giuliano, joo-lē-ä'nō boo-jär-dē'nē, Italian painter (also known under the Latinized form of his name, as JULIANUS FLORENTINUS): b. Florence, 29 Jan. 1475; d. 16 Feb. 1554. He studied under Ghirlandajo and Albertinelli, and collaborated with Michael Angelo.

Among his best works are: 'The Martyrdom of St. Catherine'; 'Betrothal of St. Catherine'; 'John the Baptist'; 'Virgin with Saints'; 'Virgin with John the Baptist.'

Bugis, boo'jēz, a people of the Indian archipelago, chiefly inhabiting Macassar and Boni, in the island of Celebes. They are muscular, middle-sized, and of a light-brown color, some being even fair. Their dress consists of a piece of red or blue striped cotton, which they wrap about their loins, and pass between their legs. They bind their jet-black hair very tastefully, in a red or blue cotton handkerchief. They pluck out the hair of their beards, and ornament their arms and legs with brass wire above the wrists and ankles, and to these the children attach bells. They are, to a notable degree, proud, passionate, revengeful, and crafty; yet they are regarded as the most civilized of the natives of Celebes, and are the chief trading people in the Malay archipelago. Their fondness for commerce has led to their settling in many places out of Celebes, and a "Bugis quarter" is to be found in most of the large towns of the different islands. They build ships of 50 or 60 tons burden, and their voyages extend from Sumatra to New Guinea. From Macassar the voyage begins with the east monsoon, the prahus trading as they proceed west until they reach Rhio, and even Malacca and Acheen, when they are prepared to return with the change of the season. They take with them native cotton cloths, gold-dust, nutmegs, silver dollars, birds'-nests, camphor, benzoin or frankincense, and tortoise shell; and return with European broadcloths and cottons, opium, unwrought iron, and tobacco, which they partly sell at the intermediate ports as they sail homeward. This is their most important voyage, but they make many subordinate ones for collecting birds'-nests, feathers, tortoise shell, trepang, and other articles of commerce.

Bugle, a genus of hardy herbs (*Ajuga*), of the natural order *Labiata*, mostly natives of the cooler parts of Europe and Asia, but cultivated for ornament in many temperate countries. The species, which attain heights ranging from 5 to more than 10 feet, have many whorls, usually of blue, purple, pink, or white flowers, and are useful for planting in the rear of borders. They are readily propagated by seeds or division. Some of the species have escaped, and may be found growing wild on moist land and in the borders of woods.

Bugle, a treble instrument of brass or copper, differing from the trumpet in having a shorter and more conical tube, with a less expanded bell. It is played with a cupped mouthpiece. In the original form it is the signal horn for the infantry, as the trumpet is for the cavalry.

Bugle, a shining, elongated glass bead, usually black, used in decorating women's apparel and also in trafficking with savage tribes.

Bu'gloss, a popular name for various species of the genera *Anchusa*, *Lycopsis*, and *Echium*, of the natural order *Boraginacæ*.

BUGONG MOTH — BUHLER

Several species of *Anchusa*, which is also known as alkanet, are cultivated for ornament. They are hardy, have blue or purple blossoms in paniced racemes, which are used as cut flowers. The plants are easily raised from seed and thrive well in sunny places. The species of *Lycopsis*, to which some botanists restrict the name bugloss, are not cultivated in America, but in some parts of Europe certain ones, especially *L. arvensis*, are considered weeds. Several species of *Echium*, popularly known as viper's bugloss, are cultivated under glass in Europe and America, especially in California, where three species are grown out of doors. They are coarse herbs or shrubs which bear beautiful spikes of very numerous white, blue, red or violet flowers with prominent stamens. They are particularly useful where the soil is too poor for many other garden plants, because they produce more numerous and more highly colored blossoms upon such soils than upon rich soil. Indeed, upon rich soil they may fail to blossom altogether.

Bu'gong Moth, a species of owlet-moth *Agrotis spina* of the family *Noctuidæ*. It occurs in millions in certain localities in Victoria, Australia. It hibernates as a moth, and in this stage was formerly an important article of food with the native tribes.

Bugonia Myth, also Bugonia lore, "Bugonia craze" and "Bugonia superstition." For more than 2,000 years a superstition has prevailed among the masses that besides the usual production of honey-bees in hives, they originated by spontaneous generations from the carcasses of dead animals, and chiefly from those of oxen. Thus, says Osten Sacken, arose in Greece the term Bugonia (from *Βους* ox; and *γενή* progeny) as well as the Latin names Bugenes melissæ or Taurigenæ apes, "oxen-born bees." Greeks, Carthaginians and Romans spoke of the Bugonia as an every-day occurrence. The poet Archelaus calls them the "factitious progeny of a decaying ox." This superstition has also prevailed in northern Africa and some parts of Asia; it continued to exist through the Middle Ages, and survived till the 16th and 17th centuries, being mentioned by Redi, Aldrovaldi (1602), while Melanchthon regarded it as a divine provision. The original cause of this delusion, which has been finally exploded by Osten-Sacken, lies in the fact that a fly which mimics the honey-bee in shape and its hairy clothing (*Eristalis tenax*, of the order *Diptera*), and which breeds in the carcasses of animals, has always been mistaken for the honey-bee. It is a true fly, with only one pair of wings and no sting, and is a little stouter and larger than a honey-bee. Its larva is the "rat-tailed maggot," that lives in open cess-pools, sewers, etc., and decaying carcasses on which the corrupt liquid forms during the secondary stage of putrescence. The Bugonia myth is, as shown by Osten-Sacken, the foundation of Samson's riddle; the supposed honey-bee issuing from the lion's carcass was evidently the *Eristalis* fly. This insect is now distributed over a greater part of the world, and is abundant in the United States. It was first detected at Cam-

bridge, Mass., in 1875 by Osten-Sacken himself. Consult Osten-Sacken on the Oxen-born Bees of the Ancient (Bugonia) and their relation to *Eristalis tenax*.

Bu'hach, a preparation for destroying insects made by grinding the flower-heads of certain species of chrysanthemums. See IN-SECT POWDER.

Buhl (bool) **work**, a description of inlaid work, consisting at first of inserting a brass scroll or pattern in a ground of dark-colored tortoise-shell or wood; but at a later period the use of wood of a different color, instead of metal, was introduced by Reisner, and to his process the modern practice of buhl-work is chiefly confined. It consists in cutting out a pattern from two veneers of different colored woods, which are glued together with a piece of paper laid between them; the pieces are then separated by running a thin knife through the paper, the patterns are carefully taken out, and the figure removed from the one veneer is inserted into the cavity of the other, the dust of the wood being rubbed in to fill the interstices. A little glue is then rubbed in, and the work laid aside to dry, after which it is ready to be glued to the box or piece of furniture which it is wished to ornament. The cutting of the pattern is effected by the use of a very fine saw, of the kind known as a key-saw, which can readily be made to run around the sinuosities of the patterns. The suitable designs for this work are continuous figures like a running vine, or the honeysuckle, the saw completing these without the necessity of discontinuing the work to commence anew. Two pieces of buhl-work are thus produced; but three are frequently obtained by gluing together three pieces of wood, and cutting out in the same manner. It is not, however, found expedient to combine a greater number of pieces. The French term for buhl-work and all sorts of inlaid work, is *marqueterie*. The name buhl is derived from a French cabinet-maker, André Charles Bouille or Boule, formerly miscalled Buhl, b. 1642, d. 1732. He raised cabinet-making to an art industry, and Reisner, above mentioned, was a German contemporary of Bouille's.

Bühler, Johann Georg, yō'hān gā'örg bŭ'ler, German Orientalist: b. Berstel, Hanover, 19 July 1837; d. April 1896. He pursued his studies in Göttingen, Paris, and London, and in 1863 accepted the chair of Oriental languages in Elphinstone College, Bombay. Among his other labors while in India, he undertook tours into various provinces in search of ancient manuscripts, portions of his collections going to enrich the libraries of European universities. Returning from India in 1880, he became professor of Sanskrit and Indology in the University of Vienna. The breadth and accuracy of his knowledge in various departments of Oriental learning made him an ultimate authority. He collaborated in 1868 in the establishment of the Bombay Sanskrit Series, in 1867-84 in the production of a 'Digest of Hindu Law'; and in 1887 in the founding of the 'Wiener Zeitschrift für die Kunde des Morgenlandes'. His work upon the 'Grundriss der Indo-Arischen Philologie und Alterthums-kunde' was interrupted by his death from drowning in Lake Constance.

BUHR STONE—BUILDING

Buhr (bér) Stone, or Burrstone, a variety of quartz containing many small, empty cells, which give it a peculiar roughness of surface. They are used principally as mill-stones. The best kinds are creamy white, with a granular and somewhat cellular texture, and are obtained in the Tertiary formation of the Paris basin, and chiefly at La-Ferté-sous-Jouarre. They are cut into wedge-shaped parallelopipeds, called panes, which are bound together with iron hoops to form large mill-stones. Numerous substitutes for the French buhr stone have been found in the United States, the most important being furnished by the buhr stone rock of the bituminous coal measures of northwestern Pennsylvania and eastern Ohio; but they cannot compete in the great markets with the French rock.

Building. The remarkable physical development of the United States in the last 20 years, with its attendant increase of wealth, is most strongly evidenced in the number of buildings of every character constructed during that period throughout the country. As an incentive to artistic improvement, and an example of co-operated effort and grouping of buildings, the World's Fair at Chicago, re-echoed in varying forms at the expositions of Atlanta, Nashville, Buffalo, and St. Louis, though temporary in character, has exerted a strong influence. Many new schemes of magnitude have been projected along lines which will require years for their completion, but the start has been made intelligently and with a view to the final result. It is only necessary to cite the proposed buildings of the University of California, at San Francisco, and of Washington University, at St. Louis, to suggest the power of this influence. The business and residential sections of the larger cities—and it might almost be added the outlying suburban districts—have undergone in many instances a complete transformation. The improvement and expansion of the steel, cement, brick, and terra-cotta industries (qq.v.) have done more to facilitate this transformation within the cities proper than any other causes. Fortunately the allied mechanical and decorative arts have kept pace with them, and in spite of the popular feeling that our cities are for the most part unsightly, they are more cosmopolitan, convenient, and interesting as to their buildings than ever before.

For the large majority of new buildings the systems of construction hitherto in vogue have been used without great change, and probably will continue to be so used. We must therefore look for signs of structural development, rather to the constructions commonly designated slow-burning, steel-skeleton, and fireproof.

In point of materials, and possibilities of decorative effect, the architect's palette has been extended to an incredible degree. Facilities of transportation make it possible to use granites, marbles, all kinds of stone, brick, and woods, ornamental bronze and iron, the most approved systems of plumbing, heating, lighting, and elevators, without approaching the domain of extravagance, and even without overstepping the limits of true economy. There has been a steady tendency toward more stable, permanent, and beautiful construction,—the outgrowth of public sentiment, which in its turn has been

stimulated by the results attained. It would have been quite impossible 20 years ago, even had individual fortunes at that time been large enough to create the demand, to build the palatial residences, churches, hotels, and office buildings which we now look upon as commonplace, for in many trades skilled artisans were not to be had, and the difficulties of securing proper materials were too great.

Steel structural building of the commercial type has advanced to such an extent, and involves such colossal operations, that vast corporations have been formed for this especial purpose. These corporations are affiliated with financial institutions seeking investments, with owners of real estate desiring to make improvements, and with large manufacturing concerns furnishing materials of construction, so that the necessary conditions for undertakings of importance are kept constantly related. The Fuller Construction Company, The Norcross Brothers Company, The Wells Brothers Company, and others of a similar nature, carry on a business chiefly made up of steel structural buildings, aggregating many millions of dollars per annum, and widely scattered throughout the United States. These companies employ armies of men, covering every building trade and involving details of office management, methods of erection and finishing, transportation and storage of materials, and the harmonizing of the various and often conflicting elements entering into such undertakings, which are almost incredible, and can be appreciated only after the most minute investigation. It may be said in general that these constitute the great movements in building which distinguish the opening years of the 20th century.

Slow-burning Construction.—In buildings requiring special provisions against the spread of fire, and where the artistic effect is not of prime importance, a frequent mode of construction is that known as "slow-burning" or "mill" construction. This has been brought about in a great measure through the efforts of the mutual fire-insurance companies in New England. The system consists usually in building outside walls (generally of brick) of concentrated piers or buttresses, connected by a thin curtain wall; the girders, beams, and interior columns are made of large timbers, and the floors of plank of a suitable thickness. It is essential to avoid concealed hollow spaces, such as furring, where dirt would accumulate. The underlying theory of slow-burning construction is that whereas small timbers, such as the three-inch joists and studs, and the one-inch flooring of ordinary construction, readily burn through and are destroyed, large timbers, under the influence of severe heat, char but do not burn through readily, as the charred surface forms a non-conductor and protects the interior. If, however, for any reason they should burn to destruction, all connections are so made that the timbers can fall out of their places without disintegrating the masonry or columns on which they rest.

Beams are spaced every 8 or 10 feet between centres, and should not be painted for several years after completion of the building, in order to avoid dry-rot. The ends of timbers in masonry bear on iron plates with anchors, or rest in cast-iron boxes, with air spaces in the sides, which permit a circulation of air, and

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reduce the risk of dry-rot. Floor planks are not less than three inches in thickness, and for spans of 12 feet usually four inches. The larger spans are less desirable than the smaller. These planks should not be over nine inches wide. They should be planed on both sides, and grooved on the edges, the grooves being filled with hard-wood splines.

Top floors are made of 1¼-inch boards of southern pine, maple, or other hard wood. It is desirable to lay top floors over a three-quarter-inch bed of mortar, or two thicknesses of heavy sheathing paper.

For rooms where there is unusual risk of fire, such as hot-air drying, it is well to protect the ceilings with plastering on metal lath, filling in solid so as to avoid any cavities. Wooden posts should be covered with asbestos paper and tin.

Roofs are best when flat, and are constructed in the same way as the floors. They should be covered with tin, gravel, or duck. Where the roof is pitched, it should be covered with shingles or slate, laid over a three-quarter-inch bed of mortar.

Superposed columns are connected by iron caps, bases, and pintles, arranged to give a proper bearing for the girders.

Partitions, if used, should be two-inch tongued-and-grooved plank set on end, and plastered both sides, on metal lath.

Doors and shutters are built of two or more thicknesses of inch boards, covered on all sides with asbestos paper and tin, lock jointed.

The underwriters' associations have formulated in detail the best practice in mill construction, and are willing to advise on all questionable points.

Steel-skeleton Construction.—The closing years of the 19th century witnessed a development in the structural use of steel for buildings which is wholly without precedent. While columns and floor beams of iron or steel had been in use for many years as interior supporting members, it was not until conditions demanded buildings of extraordinary heights that the metal framework was extended to the exterior as well as the interior structure. Exterior walls constructed entirely of masonry must be made too thick for economy of space and materials if the building which they enclose is more than six or seven stories high.

The first step was made by introducing iron columns in the masonry of the outside walls, with the sole purpose of supporting the adjacent floors, the masonry of the walls carrying itself on its own independent foundations. This system was found also to lack economy after the possible height of buildings had been increased a few stories. The culmination of the system was reached when the exterior frame was designed to carry not only the floors and their various loads, but also the exterior walls. Each story now has its enclosing wall independent of the story above and below it, so that, as is frequently the case, the outer facing or curtain wall of the high building is started at several levels at the same time at intervals of two or three stories.

There would seem to be no limit constructively to which this kind of building can be carried, provided the area of the building at the base is sufficiently large.

Vibration and deflection under the pressure of the wind must be provided against by

stiffening braces or ties in the floors or partitions, more particularly where the height of the structure is relatively great.

Where streets are narrow, the crowding together of a number of such buildings darkens the streets and often produces disagreeable and even dangerous currents of air. The trend of legislation in large cities is toward restriction of height, Boston having already fixed a limit of 125 feet from the sidewalk level to the top of the cornice line.

There are three elements which enter into the construction of the steel-skeleton building,—foundations, columns, and floors. Of these three elements the column is the most important: for while foundations may settle, deranging the floor levels and causing the building to lean out of plumb; and while floors may bend or break without serious danger to any parts of the structure other than themselves,—columns, if they fail, may entail the collapse of the entire structure. For this reason, in the best work, columns are made of the softer, less brittle grades of steel, while floor beams are permitted of "medium" steel, a harder and consequently more brittle grade.

Many sections of columns have been devised, each having its own particular advantages, but columns in which all the surfaces, except those between riveted plates, are accessible, are generally to be preferred. These columns usually consist of a single web or plate, with one or more flange plates connected to the web by riveted angles. Other sections have been devised, made of Z bars or of channels connected by lattice plates, and a very ingenious column is that known as the Gray column, made up of angles in pairs connected by ties. The choice of any one form depends upon the stability of its section, the ease of procuring the parts of which it is composed, and the facility of connections. It is sometimes necessary to use the box column, but it is not to be recommended by reason of the inaccessibility of the interior surfaces. Water and steam pipes are sometimes run inside the fireproofing of columns next to the steel, but this is to be avoided if possible.

Columns are usually made in two- or three-story lengths. The bearing parts are carefully ground normal to their axis, and the connections are made by riveted cover plates. The extraordinary weights which these columns are called upon to carry, demand on ordinary soils a very extended footing. If this were attempted by the old method of brick or stone piers, the foundations would have to be carried to such depths that the system would not be economical. The customary method is that known as the grillage-beam system, in which the column starts from an iron or steel shoe which bears upon steel beams extending on opposite sides of the shoe, and bearing in turn upon one or more layers of beams bolted together and completely imbedded in concrete; under all is a layer of concrete whose area depends upon the compressive resistance of the soil. In rare cases the foundation is of solid rock, and the area may then be reduced to a minimum.

A peculiar type of grillage foundations is required for columns on or near party lines, beyond which the foundations may not extend. A cantilever construction is then used, whereby the wall column foundation is

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united by beams to the nearest interior column foundation, so that the two act together and in a measure counterbalance each other. Where foundations occupy an interior corner of a property, and must be maintained inside two intersecting party lines, it is often necessary to combine four grillages in the same fashion. Where the soil is of a very compressible nature, as is frequently the case in many parts of Chicago, the entire area of the building may have to be covered by a distributing foundation of concrete and beams, forming a pan upon which the building floats. This has been followed in some cases by settlements due to the leakage of the underlying soil, a result which might easily develop from the construction of other buildings in the immediate neighborhood. Where possible, it is preferable to penetrate through soft soils to a firm bed. In the lower part of Manhattan Island bed-rock has been reached by pneumatic caissons. These caissons are made of steel plates riveted together. The excavation is made under or in the caisson under air pressure sufficient to hold back any water-bearing material which may underlie the foundations of adjoining buildings. After the caisson has been sunk to its proper depth it is filled with concrete or such other masonry as has been designed to form the foundation. Hydraulic caissons have also been used for the same purpose. Where excavations adjoin high buildings on sandy soil, and are carried to a greater depth than the grillages, as in the case of the work on the subway in lower Broadway, New York, an artificial freezing process is sometimes resorted to. A network of tiny pipes is inserted into the sand foundation, winding in and out among each other, so as to reach every part of the foundation soil. A cold salt solution is sent through the pipes, causing the sand foundation to freeze solid, making it as firm as bottom rock. This is a very expensive process and not to be employed unless other means fail.

The floors used in steel-skeleton construction may be of any of the ordinary fireproof types, but in designing the floors it is necessary to connect the columns by steel beams or girders, which act best for the stability of the building if arranged in continuous straight lines. The voids between the girders are spanned by beams, whose spacing is dependent upon the style of floor to be used, varying from 5 to 12 feet, the spaces between being filled by brick arches or porous terra-cotta tiles, or by concrete slabs. The amount of material in the beams must be exactly sufficient for the work—no more or less. This is essential, not only for economy, but also to reduce the dead loads on the joints, columns, and foundations. There are many varieties of each of these systems, nearly all requiring the use of steel ties, plates, or rods. For spans over 12 feet the monolithic concrete floor reinforced by steel bars or metal lath has been used, but there is a great tendency to deflection. The long-span systems are still in their infancy.

The girders of the exterior walls, commonly known as spandrel girders, are used at or near the level of each floor, and should be connected to the columns by knee or angle braces.

While the exterior walls of the building are carried in part on the spandrel girders, it is customary to rivet additional angles or channels on the outer face of the columns for the support of the outer four or more inches of the wall.

All projecting parts of the exterior, such as belt courses, cornices, and balconies, must be supported by special framings. The ornamental finish of cornices having any great projection is often secured to the frame by iron hangers.

All parts of steel framework, except those buried in concrete, such as grillage beams, should be painted with the greatest care, as their preservation depends almost entirely on the quality of paint used and the way in which it is applied. All surfaces should be first thoroughly cleaned of scale and rust. It has been found that concrete adheres to a clean steel surface, and is a sufficient protection. All remaining parts should be given a coat of oil at the shops; they should then be painted with a coat of red lead or graphite paint upon arrival at the building, followed by a second coat after they are assembled. Sometimes a third coat is given, but it is scarcely necessary if the two previous coats have been properly applied.

Fireproofing.—While the steel-skeleton building is economical from the constructive standpoint, its usefulness and safety are greatly impaired if it is left unprotected against the ravages of fire. Many systems of fireproofing have been devised, all of which, however, consist in enclosing the parts with a non-combustible substance,—usually a clay product, or concrete or plaster,—applied in blocks or molded forms, set in mortar. For the outside of exterior columns and girders it is considered sufficient to lay the outer facing of the wall, if of brick or terra-cotta, directly against the metal. Granite, by reason of its friability under the combined action of heat and water, should be kept sufficiently far away from the structural parts to allow of the insertion of a layer of concrete. For all other parts of the skeleton the usual protections consist of two inches of porous terra-cotta block, plaster block, or cinder concrete. Columns and beams are sometimes enveloped with a sheet of wire cloth or expanded metal, and plastered.

None of these systems may be considered absolutely perfect, since they have all shown serious signs of deterioration under the continued action of a fierce fire, but it is a conceded fact that concrete, as a fire-resisting material, is unequalled.

In connection with fireproofing it is essential that interior partitions be built of non-combustible materials. Those most frequently employed are of the same nature as the fireproofings just described. Porous terra-cotta blocks and plaster blocks, three or four inches in thickness, dependent upon the height of the story in which they occur, have certain advantages by reason of the rapidity with which they can be set up, and the ease with which they can be removed where alterations are desired. Partitions are often made of small T or angle irons, over which is spread expanded metal or wire cloth in one or two thicknesses, to which the plastering is directly applied. Double thickness partitions of this sort are more sound-proof than those first mentioned.

In many so-called fireproof buildings wood finishes are desired, which with the contents are a menace; but experience has shown that fire can usually be confined to the room in which it originates, and can be checked in a few minutes. Methods of fireproofing wood have been devised, and consist of injecting a fireproofing solution into the pores, either under pressure or



STEEL SKELETON CONSTRUCTION.

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by capillarity. Its use is not frequent, however, being largely limited to war-ships.

Exterior Finishes.—The artistic effect of a building depends more upon its color than upon its form either in general lines or detail. This is due to the fact that a good color sense is commoner than an appreciation of line and form. So true is this that many excellent designs have been utterly ruined by execution in unpleasing materials, and many meretricious designs receive public commendation entirely due to their satisfactory color effect. The search for novel and beautiful, as well as durable effects, has led to a great multiplication and improvement of materials.

Of all exterior materials the granites easily hold first place for buildings requiring dignity and durability. The finer granites come from New England, and range from various tones of white, through the deepening grays, into the dark reds, greens, and blacks. Many of the granites present beautiful surfaces when polished, and in general combine well in color scheme with almost any other material. The southern granites, so called, are not truly granites in the geological sense. They lack warmth and brilliancy of color, and by reason of their softness stain easily in a harsh climate or smoky atmosphere.

Sandstones, such as those from Ohio, Maryland, Pennsylvania, and Massachusetts, are reliable materials, the particles being well cemented together. They vary in color from the whites to the browns, and have practically superseded the Connecticut brown-stone used extensively in the 'sixties and 'seventies, but whose loose stratification resulted in early deterioration upon exposure.

Of the limestones, that from Indiana has had great popularity by reason of its softness for cutting when fresh, the large sizes in which it is obtainable, and, in the buff varieties, its beautiful color. The stone hardens upon exposure to the air, but its color changes, improving for a year or two, to become almost black after a period of 7 to 10 years.

The white marbles of Vermont, New Hampshire, and Georgia are thoroughly reliable, but discolor when not assuming the soft warm tones of the old marble structures of Greece and Italy.

Gneisses abound throughout the Eastern States, some of them approaching very closely in texture to the true granites.

For durability and permanency of color, combined with economy, no exterior facing can surpass natural red brick. The appreciation of red brick has fortunately developed beyond the point where the smooth Philadelphia pressed variety is considered the only brick desirable for the finest work, so that we now have reds toning into the browns and purples, and combined often with dark headers, from which it is possible to lay up a simple surface full of artistic interest. Outside the plain red, there is a wide variety of brick within certain limits; whites, buffs, browns, or grays are easily obtainable both in the plain colors and mottled, and made by either the wet or the dry process. Color, width, and style of mortar joints, if used knowingly, can be made to intensify or soften the natural color of the brick. American enameled brick holds its own with the English, and is invaluable for light-shafts and damp places.

Nearly all makes, however, craze or chip in time.

Architectural terra-cotta, as an exterior finish, easily claims first rank in point of development. Many steel structures are covered entirely with it, excepting perhaps parts near the ground, subject to abrasion. It can be made in almost any color by means of "slips" or "glazes," and it lends itself readily to decoration. The use of terra-cotta is of advantage to the architect, in that he can see the models for every part of the work as they are in process, and vary them to his satisfaction before they are finally cast. Economy in the use of terra-cotta comes chiefly from minimizing the number of molds; but this must be guarded against, for, if pushed to excess, monotony is likely to result.

Ornamental bronze, copper, and iron work, through improved processes of manipulation, have added greatly to the possible richness of exterior effect.

Outside enclosures of sheet metal, such as iron or aluminum, are rarely æsthetic. Corrugated sheet iron has been used extensively for freight sheds, wharf enclosures, and similar ordinary constructions, where no effort for good looks has been made. The enclosure of steel-skeleton buildings with metal is not to be counted upon where such buildings are tenanted, as it is too great a conductor of heat.

Rough-cast and plaster work are most admirable and sympathetic as exterior wall finishes, where the extremes of temperature from winter to summer are not too great. Even adobe structures are possible in the South and West, but their use is most limited. Rough-cast or pebble-dash is applied to both masonry walls and lath; it is more durable on masonry, as the expansion and shrinkage of lath tend to disintegrate the mortar. Rough-cast is combined frequently with timber work in imitation of the old English half-timber constructions, and is specially adapted to domestic buildings of the freer country sort.

Concrete walls, where of the right texture and color, such as that made from coquina in Florida, give a pleasing effect.

Roof coverings comprise tin, copper, slag, tiles, slate, and shingles, each having its own appropriateness. Copper is the only permanent one of those mentioned, and slag is the next best. Tiles and slate require constant repairs, and shingles rarely last more than 20 years. Shingles lend themselves admirably to staining, and are deservedly popular. Thatch is attempted where picturesqueness is demanded.

A roof interesting from the constructive standpoint is that commonly used on the steel-skeleton building. It is known as actinolite, and consists of a number of thicknesses of heavy felts bedded upon a smooth Portland-cement surface, and covered with a roofing cement on which are laid vitrified tiles with the joints thoroughly filled, practically forming a pavement.

Interior Finishes.—For ordinary buildings the interior finish of floors, walls, and ceilings must necessarily be simple, consisting of cement or wood for the floors, and plaster for the walls and ceilings, except that in the case of mill construction walls are usually made of hard red brick, pointed inside the same as outside, and

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ceilings consist of the dressed undersurface of the floor planking white-washed, painted, or varnished.

Cement floors are the most permanent, particularly where they are subjected to moisture, although the hard pine and maple flooring commonly used is less tiresome to walk on and is sufficiently durable.

The so-called patent plasters have come largely into use by reason of their hardness and quick-setting quality. They are mixed by machine in fixed proportions, and are therefore more dependable in quality than the ordinary lime mortar. If applied to lath, the patent plasters require that the lath, if of wood, shall be wet before application, or, if of metal, that the metal be of heavy threads, as the finer wire cloth is sometimes eaten away by the ingredients of the plaster.

Tiles, whether of marble, ceramic, or glass, form excellent interior finishes, except that small tiles for floors are likely to loosen, and frequent joints in tiling become unsightly through discoloration. The glass tile known as "opalite" produces a finish similar to enameled brick, and has been shown in some cases to be more lasting. Interlocking rubber tiles are desirable in cases where there is risk of slipping, such as for elevator floors. They are also good deadeners of sound.

Beautiful effects of mosaic, both of marble and of glass, are easily obtainable—a great variety of color and design is largely in their favor. All of these applied finishes require a solid base, preferably of masonry or concrete.

The variety of woods for interior finish is almost without limit, and has been greatly increased by staining and by methods of finish.

In no department of interior ornamentation has greater progress been made than in plaster work—a system which can be pushed to almost any point of elaboration, and which lends itself perfectly to painted decoration. In fact, there are few materials that cannot be simulated in plaster if the decoration is clever.

The field of interior decoration was never wider, and the knowledge of the application of leathers, stamped, modeled, and woven fabrics, and the thousand and one other forms of wall applications, never better understood.

In marble for interior use America is not particularly fortunate. Granite and limestone produce satisfactory results, but most of the American marbles are cold and lacking in richness of texture. Among the best marbles are the Knoxville Gray, and a few of the whites. For the more beautiful effects recourse must be had to the imported marbles, such as Sienna, Numidian, Pavonazza, Alps Green, and others.

EDGAR V. SEELER,
Architect.

Building and Loan Associations, co-operative organizations, originally designed to aid their members in procuring homes, at the lowest cost, and on the easiest terms. Later developments gave them some of the functions of a bank for savings. The associations are a development, dating from about 1835, when a few experimental ones existed in the United States, the movement beginning in Pennsylvania. The original associations proving successful, plans were gradually improved, until by 1850 they became an established part of American institu-

tions. They have been operated under various titles, besides the above, as mutual loan associations, home assistance associations, co-operative savings and loan associations, and co-operative banks, the latter title being popular in New England.

The basic plan of these associations is the issuing of stock, which is paid for in monthly instalments, and the loaning of the money thus raised to shareholders, borrowers paying twice as much per month as lenders. It has been common to give the shares a maturing value of \$200 each, on which the holders pay \$1 per month as long as they are lenders or investors, and \$2 per month, as soon as they become borrowers on their stock. In addition to the \$2, the borrower is also liable to have to pay a premium to secure his loan, when there are more shareholders seeking loans than there is money to loan.

Under such an arrangement an association received an average of \$1.50 per month per share, and in the course of a little more than 11 years this was theoretically sufficient to bring the shares to par value. In practice, the shares would sometimes run out in 10 years, if premiums on loans ran high, and sometimes 12 or more years were required for shares to reach the \$200 value, if the association had passed through hard times. When the shares reached the \$200, or other maturing value, the lenders received their money back, and the borrowers had their loans canceled. Under the early plans, the maturing of the shares wound up the association. This was a hardship to many, and as a result the issuing of shares in annual series has become common. This enables outsiders to come in and take shares any time a new series is opened, or to purchase the most recent series, by paying the dues for the number of months such series has run.

The legislatures of the various States have made laws rendering easy the forming of these associations, because they have proven to be a good means of enabling wage workers to build and own their own homes. The parties interested manage their own affairs, and as the money is loaned out as fast as it comes in, there is seldom any loss by speculation. To illustrate how these associations assist a man of small means to build and pay for a home, let us follow the system from his point of view. Suppose he has a lot of land, for which he has paid \$400. He can subscribe for five shares of an association, of the par value of \$200 each, paying therefor \$5 per month. Every month, or every few months, there will be money to be loaned, and he attends the meetings, and when he thinks the premiums are low, he bids in a \$1,000 loan. If he has bid 10 cents premium on this, he must pay \$2.10 each month on his shares, from the time he receives the use of the money. As a matter of fact he does not handle the money, but having bid successfully, and the directors having passed upon his lot and proposed house as a safe loan, he sets a builder to work, and his house is put up, the association taking a mortgage on it for \$1,000, and the builder collecting his \$1,000 from the association. Every month he pays his \$10.50 into the association, just as if he were paying rent, and in 10 or 11 years the shares mature, and the home is paid for.

The plan appeals to the wage worker, because of the easy payments. It appeals to small lenders, because it affords them a sort of savings-

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bank, and encourages systematic savings. Small tradesmen and merchants are almost as apt to become interested in such associations as are those who work for a weekly wage, and the economical methods by which a large amount of money is borrowed and loaned safely have attracted many to the associations as being a safe depository, and sure to pay 6 per cent dividends.

Originally, these associations were usually confined to a town or locality, no loans being made beyond the territory where most of the members lived and knew the value of the property. But within recent years both State and national associations have been organized, which do business anywhere within the limits of their larger territory.

The management of an association is usually lodged in a board of directors elected annually from the shareholders, and whose members serve without pay. They pass upon the loans, and having investments of their own to protect, closely guard the association treasury. The secretary is customarily the only salaried officer, and is often paid for doing the detail work by a system of small fees. Sometimes the fines levied on delinquents are his sole compensation.

Each association makes minor laws of its own, and many vary the plan as above given in numerous details; but the general principles here outlined are the same with all. There are now many thousands of these associations in the United States, doing a present business approximating \$600,000,000.

Building Lease. a lease of land for a long term of years, usually 99 years, at a rent called a ground-rent, the lessee covenanting to erect certain edifices thereon, and to maintain the same during the term. At the expiration of the lease the houses built become the absolute property of the landlord, unless otherwise provided in the contract.

Building Materials. The improvement in the art of building indicated by the variety of building materials, in iron, stone, clay, and wood; the machinery for their production; the skill with which these materials are used singly and in combination; the appliances for rapid construction; the devices for the conveniences and comfort of the occupants of buildings; and the artistic treatment of the interior and exterior of edifices, is self-evident to any person who compares the structures erected within the past few years with those put up less than a quarter of a century ago. These improvements in the art and science of building may be said to have been achieved within the business period of a single lifetime, without going back to the time when brick, stone, iron, and wood were worked into shape by laborious processes, afterward being used in the most commonplace manner, and when almost everything in which artistic effect was sought had to be imported from Europe, or the skilled labor to produce it had to be specially brought from the old countries. There are still standing in the lower sections of the city of New York dwelling-houses erected a century ago, old office buildings proudly named after owners who have passed away in the natural course of events, and old hotels that were once looked upon as marvels in their way. And yet many things that appeal to the eye and receive admiration as component parts of new buildings cannot strictly be classed as building

materials, however essential to artistic effect or to comfort and convenience such things are. Decorations in oil and water colors on walls and ceilings, hangings of paper, leather, and other materials, electric-lighting, steam-heating, and even the elevator, without which the modern high building would be impracticable, are among these.

The height to which many buildings are carried indicates the greatest advance in the art of construction, for such edifices represent principles untried 20 years ago, and have for their basis the use of iron or steel for the support of the floors, instead of masonry, reducing the walls to a mere enclosure for keeping out inclement weather, and for protecting the iron-work incased in them from damage by fire. Twenty-five years ago a six-story building was considered very high; but passenger-elevators came into use, adding value to the upper stories. Ten- and eleven-story edifices followed. With solid masonry the thickness of a wall is regulated by its height, tapering by stories from the bottom to the top. Under this method the great thickness of the lower portions of the walls occupied the most valuable space for rentals, and with a height of 10 or 11 stories the greatest practicable limit seemed to be reached. No more of the area of a valuable lot could be given up to the occupancy of brick walls. Suddenly and simultaneously a number of architects and engineers grasped the idea that metal columns could be carried up to any desired height, having girders between on which to carry the floors and the requisite amount of masonry as an outside protection. Thus an edifice could be elevated to the clouds, and irrespective of height, take up far less of the area of a lot than would be required by the old-fashioned method of solid brick walls. Fifteen, twenty, and twenty-five story buildings quickly followed, and it is conceded that structures 500 feet high, or of any height, can be safely erected on this plan.

The use of a framework, or, as it is generally termed, a skeleton, of iron or steel, with curtain walls supported on girders placed between the columns, the latter and the girders carrying the floors in addition, is an American novelty, notwithstanding it has for its immediate prototype the cast-iron fronts with column standing upon column. The first cast-iron front ever erected in the world was put up in New York in 1848; yet that was but a repetition of iron columns and lintels long previously used as a substitute for stone and brick to the extent of a single story. The skeleton, as used in the lofty buildings, is simply an evolution or expansion of the principle contained in the familiar cast-iron fronts, and in the oft-used method of increasing the bearing strength of a brick pier of too small an area safely to bear alone the load to be imposed, by placing an iron column in the centre of the pier.

Obviously it is to the interest of an owner, as well as necessary for public safety, that an excessively high building shall be so constructed that in the event of fire the building itself shall not be seriously damaged, nor shall it imperil the safety of surrounding buildings. Laws regulating the construction of buildings in New York require all structures above a stated height to be built fire-proof; that is to say, they must be constructed with walls of brick, stone, or iron, the floors and roofs of materials similar to the

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walls, and the stairs also must be of incombustible materials. Fire-proof floors are now commonly constructed of rolled iron or steel I-beams.

The first wrought-iron I beams rolled in this country were made by Peter Cooper, at his mills in Trenton, N. J., about 1860. The Phoenix Iron Company, of Pennsylvania, began to roll them about the same time. Prior to that date there was a very limited number of fire-proof buildings in this country. Those which did exist, chiefly belonged to the government. In the early fire-proof structures erected in New York—the Cooper Union building, Harper's publishing building, and the Historical Library building—the iron floor-beams are of a shape known as deck-beams, being very similar in section to an ordinary rail, only deeper. The depths of I-beams have been increased from 6 and 7 inches up to 24 inches, and mild steel has displaced wrought-iron. Eastern and western rolling-mills yearly turn out an enormous quantity of rolled steel I-beams for use in buildings.

Before the time when rolled beams could be expeditiously procured and at moderate prices, cast-iron beams were used. When the openings to be spanned were of considerable width, bowstring-girders, or arch-shaped castings with horizontal wrought-iron tie-rods connecting the ends, were commonly used. It is admitted by all who are competent to judge that wrought-iron or steel is superior for use where the load tends to tear the metal asunder; and in course of time cast-iron for beams and girders became almost entirely superseded by rolled wrought-iron, and later on by rolled steel. The use of cast-iron beams, lintels, and columns in commercial buildings kept a number of large foundries in New York busy for many years. More than half a century ago the Jackson Architectural Iron Works, now a corporation, were started, being practically the pioneer foundry for the manufacture of iron work for buildings. It was in these works that the first entire iron front was made, from drawings furnished by the introducer, James Bogardus. Several firms that became quite renowned in the line of architectural ironwork—among them J. B. & W. W. Cornell—procured their cast-iron work for many years from the Jackson foundry. Iron fronts became popular and New York supplied the demand from Boston, Philadelphia, Chicago, and St. Louis, until finally their manufacture was taken up in every section of the country. During the later years architects have shown a preference for fronts of brick with terra-cotta or stone for trimmings, and cast-iron fronts have largely gone out of fashion, perhaps later on to be revived, particularly for commercial structures, as cast-iron has in its favor unequaled advantages of lightness, strength, durability, economy, incombustibility, and ready renovation. John Roach, who became celebrated as an iron ship-builder, started in the foundry business in a small way in New York about the year 1840, making castings for builders' uses; but he veered off into ships' castings and machinery, and finally into building ships.

The Jackson foundry was started to manufacture grates and fenders, and during all the years of its existence has continued that as one of its principal branches. It was the establishment of a new industry in this country, for these things were all imported from abroad. While fireplace fronts can scarcely be included

among "building materials," in the ordinary understanding of that term, yet they go to make up a permanent and necessary part of buildings. There are a number of other adjuncts to an edifice that cannot be included as building materials, but each of which makes progressive steps in providing useful, convenient, and comfortable structures. In a modern building electric light and steam-heat are looked for as matters of course; and mail-chutes, telephone, and electric call service are developments of recent years. In dwelling-houses gas-stoves are supplanting coal ranges for cooking; the old-fashioned pan water-closet has given way to the S trap-bowl; bath-tubs are of enameled iron, solid porcelain, or marble, instead of wood lined with copper or other metal; pneumatic or electric appliances open the street door at will; locks that are unpickable and burglar alarms secure reasonable safety from would-be intruders; and in a variety of ways the conveniences, comforts, security, and healthfulness of homes have been added to of late by provisions made in the planning and construction of buildings.

Formerly French or English plate glass was demanded for every good building. American plate glass slowly but surely worked to the front rank in the quality, and has become one of our great home industries. The invention of a fireproof-glass, such as is made by enclosing a wire screen in the sheet of glass, has worked a revolution in interior construction, so that glass is now used where formerly only a solid fire-proof construction was allowable. In art glass work for windows, American manufacturers and American artists produce the equal of the best made in any other country.

Marbles in great variety, sandstones in almost every color, and granite of various hues are quarried in all directions; and through cheap transportation by water or rail, every section of the country has an available supply of every kind and color of stone for architectural effect in buildings. Stone is planed and carved by machinery more accurately and quicker than by hand. The labor thus saved, and the consequent cheapening of molded and carved stone, have increased the consumption and given employment to a far greater number of workmen than would otherwise have been the case. The world's experience has shown, moreover, that while machinery increases production, it also opens new fields for useful labor, and the cheapening of the cost of manufactured products proportionately increases their consumption by bringing them within the reach of a greater number of persons. Not only in stone, but in every kind of material which enters into the construction and finishing of buildings, has machinery reduced the cost. The army of workmen is vastly greater in numbers, and wages are higher than when hand labor had the field entirely to itself.

Wood moldings were laboriously worked out by hand in former years. Machinery changed all that, so that to-day a carpenter would as soon think of hewing out timber from the log by hand as to work out by hand the trim for a house. From the molding-mill the trim now comes all ready to be put in place. Hard woods, especially ash and oak, have largely taken the place of white pine for trim, and it is due to machinery that doors and architraves around openings can be obtained in hard woods at less

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cost than the same in soft woods could have been had a few years ago. Hard wood for mantels, of all grades from the simple and cheap to the elaborate and costly, has, to a great extent, taken the place of marble and slate. The advance in wood-working machinery and in carving by machinery enables very artistic and elaborate work in wood to be obtained at very reasonable prices, and architects and builders have not been slow in availing themselves of their opportunities. Improved fillers and varnish coatings for hard woods are on sale in every paint store, and cabinet finish is easily and cheaply produced. Ready-mixed paints for interior and exterior use are extensively used, the grinding being done by machinery, the mixing, therefore, being more thorough than by hand. Paint mixed with such ingredients that fire is repelled from wood or other materials coated with it is a comparatively new article of manufacture, but is being largely used for protecting frame factories and other buildings where the danger of burning is great. Wire-cloth, in place of wood lath, is much used, not only because it keeps the plaster better and prevents cracks, but because it makes a good fire-resisting surface for ceiling under wood beams and on the sides of wood studs. A variety of solid, thin, light, and strong partitions of iron and plaster are used in place of the wood stud, lath, and plaster partitions, so dangerous in case of fire. Mortar and plaster mixed by machinery are supplied to masons in any quantity required. The mixing being more perfectly done by machinery than by the hoe, the blisters so often seen on finished wall surfaces, due to bad mixing, are obviated. To ordinary plaster, other ingredients are now added, these plaster mixtures being known in the market under several different names, but all having for their object hardness and durability. A few years ago American hydraulic cements were looked upon with extreme suspicion by engineers and architects, and imported Portland cements were demanded for use in important foundation work. Now American cements are recognized as having equal strength with the English and German cements, and are sold at lower prices than the imported brands.

In appearance the streets in our great cities are taking on a lighter hue, due to the light-colored brick so generally used for the fronts of new buildings. Twenty-five years ago in New York red was the universal color for front brick, the choice brick being brought from Philadelphia and Baltimore. The clays of New Jersey give us brick in white, lemon, buff, mottled, and other hues, and these are used to the exclusion of red for fronts. Terra-cotta, in a variety of colors and artistically executed, enters largely into the ornamental treatment of the fronts of buildings.

In the post-office building in New York, hollow tile flat arches between iron floor beams were introduced for the first time in this or any other country. This was the invention of Mr. B. Kreischer, a manufacturer of fire-brick in New York. The flat arch system provided a level ceiling at once, at a less cost and with much less weight of material than filling in between iron beams with segmental arches of common brick, and then furring down with wood or iron to obtain a level ceiling surface. The new system came into general use for fire-

proof buildings all over the United States. A long litigation ensued over the patent, but under the crucial test of publications from all parts of the globe, the courts finally decided the Kreischer patent void for want of originality. Abroad the system of flat arches whose end sections abut against rolled iron or steel beams for floorings is recognized as an American invention, and at a meeting of the Royal Institute of British Architects, held in 1882, this method of constructing floors was commented upon, the chairman of that meeting going on to say that when a man in the United States brought out a good invention connected with building or anything else, it was straightway adopted all over the country, remaining in use until something better was provided, when that, in its turn, was taken up.

Another American invention the merit of which has been recognized everywhere is illuminated tiles—the placing of small disks of glass in iron plates which form a walking surface and at the same time transmit light to a vault or room beneath the sidewalk. The name Hyatt will always be associated with this invention in America and Europe.

Iron for the frame and bars of skylights has superseded wood in all large cities, in part because modern building laws will not permit the use of wood for any but very small skylights. Twenty-five years ago iron skylight bars were of solid rolled iron. An American inventor, Hayes, introduced skylight bars of sheet iron, bent by machinery to a proper shape, and these light, strong, and cheap bars are now everywhere in use. Galvanized sheet-iron for cornices on the fronts of buildings has taken the place of wood in cities, and in the manufacture of them an enormous amount of sheet-metal is used annually.

In bank and safe deposit buildings the burglar-proof work for vaults and strong rooms represents a very large manufacturing industry in providing what is deemed essential to the equipment of such structures. Bank vaults of chilled iron and steel were used a long time ago, but the increase in the demand for burglar-proof work resulted in improved methods of construction, and in the invention of better time locks and alarm appliances to give warning of attempts at burglary.

Wood necessarily enters into the construction of buildings of every character. Hundreds of millions of dollars are invested in the work of handling this material and several hundred thousand artisans are employed in preparing it for use from the time the logs are gathered in the forests until they are fashioned into the required shapes. This industry is among the most important in the United States, but there are no reliable data extant from which anything approaching an accurate estimate of the capital invested or the number of timber workers employed can be determined. Some idea of its magnitude may be formed when it has been estimated by builders of wide experience that out of some 12,000,000 dwelling-houses in the United States, nearly 11,000,000 are built mainly of wood.

In the great number of fire-proof buildings the stairs, of course, are made of incombustible materials—iron for the strings, risers, and railings, and slate or marble for the treads. Several large iron works devote their attention solely to this class of manufacture. The variety of

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designs and the coating of the iron with other metals by electro processes, or by a process that preserves iron against rust without paint, go to make up in extent and beauty a branch of iron manufacture that has developed from very small beginnings to extensive proportions. The enclosure of elevator shafts in fire-proof buildings is generally of iron grille work, which has the same characteristics as iron stair work in points of design and workmanship.

In putting the different kinds of materials in place in the building a saving of time and labor is sought. Even in ordinary buildings, brick and mortar are no longer carried on men's backs up a ladder. Hod-hoisting machinery has taken the place of manual labor in this respect. On important buildings power derricks lift all heavy weights from the ground to the uppermost story—stone, iron, and everything else. It is not an unusual sight to see a cartload of brick brought to a building, the horse then unhitched, the cart hoisted by the derrick to an upper story, and the brick dumped, after which the cart is lowered to the ground. The riveting of connecting parts of ironwork in important buildings is done by machine instead of by hand. (See PNEUMATIC MACHINES.) Foundations for high buildings, where the soil is uncertain or inadequate to bear enormous loads, are carried down to rock by means of cylinders of iron sunk to the required depth and then filled in with masonry or concrete. In other cases a framing of iron beams covering the whole area of the building, much like a raft, is laid and covered with concrete.

Architecture has played a most important part in the development of the modern building. Consequently a slight departure from the main thread of this subject may be allowable in order better to trace the progress of the century in the building line. The origin of architecture is wrapped in obscurity. Caves and huts of branches were the first buildings made by man. Examples of a second stage of development are found in the stone monuments of various islands in the Pacific and in the ancient monuments of America. The ruins of Mexico show no foreign influence in their artistic workmanship, and are therefore regarded as an independent national development. Some of these show an advanced and highly ornamental form of the pyramid. Of Oriental architecture the Egyptian examples are perhaps the most striking. The numerous monuments of India can be compared in extent and magnificence only with those of Egypt. China received its architecture from India. Grecian, Roman, and Gothic architecture furnishes high examples of the art, and many of its features are interwoven with modern architecture.

A new period in the development of architecture began about the close of the 18th century, when a reaction against the rococo style made itself felt. Important examples are the Mint in Berlin and the Brandenburg Gate, built at the close of the 18th century. The age and conditions of American civilization do not admit of an indigenous architectural development, as in older countries, and therefore we find in the United States examples of almost every known national style. The building operations of the settlers of the 17th century were modeled upon those of the countries whence they had emigrated.

Thus the early buildings of New England and Virginia are essentially English; those of New York and Pennsylvania are Dutch and German; while Florida shows thoroughly Spanish architecture, and New Orleans is practically a transplanted French city. With the beginning of the 18th century the increased intercourse between the individual colonies gave rise to a more homogeneous architecture. The more important buildings of the period are all the works of English architects, among them being King's Chapel, Boston (1749), by Harrison, and Saint Michael's, Charleston, S. C. (1752), by Gibson, a pupil of Wren. To the same period belong Christ Church, Philadelphia, and the old State-houses of Boston and Philadelphia. The dwelling-houses of the colonial period were simple in style and usually of wood, depending for their external effect principally upon the use of columns, and with interiors of great plainness, the ornamentation being concentrated in the staircases, of which some artistic examples are still in existence.

The first and chief of the government buildings at Washington was the Capitol. In its present form the capitol is a monumental edifice with a dome 135 feet in diameter, rising 217 feet above the roof. The architectural effect is secured by the free use of porticos and colonnades, and by the striking approaches. The other government buildings are of a similar style. Since that period a style founded on the Italian Renaissance has been employed in nearly all public buildings, sometimes with great success. To this period, also, belongs the New York City Hall (1803-12), built of marble and freestone, which at the time of its erection surpassed all buildings in the city in material and conception. For a time Greek architecture became the fashion, and it was applied to many buildings. To this development belong the custom-houses in Philadelphia and New York (with monolithic columns), and Boston and Girard College, Philadelphia.

The first successful attempt in Gothic architecture was the erection, in 1839-45, in New York, of Trinity Church, by Richard Upjohn, which has since remained the accepted type of American church buildings. From the church the Gothic style was for a time carried to all other classes of buildings, but was soon abandoned. With the rapid growth of the country in wealth and ambition there succeeded crazes for various architectural styles. Egyptian, Moorish, Swiss, and other types were employed, but finally all of them were abandoned. Subsequently a revival of Gothic architecture, under the influence of Ruskin, produced some buildings of merit, among them the National Academy of Design, New York (lately taken down), largely in the Venetian style; the State capitol of Connecticut, at Hartford; and the Harvard Alumni Memorial Hall, at Cambridge.

During recent years the prevailing style for municipal buildings has been that of the French Renaissance. Imposing examples of this style are seen in the new municipal buildings of Philadelphia and in the new buildings of the State and war departments at Washington. Many of the newer capitol buildings of the various States are of architectural merit, the most elaborate being the capitol at Albany. In church architecture, New York, Boston, Chicago, Baltimore, Philadelphia, and some western cities

BUILDING SOCIETIES—BUILDING STONE

possess good examples of Gothic and other styles. The largest and most costly existing church edifice on the Continent is Saint Patrick's Cathedral, in New York, where the Cathedral of Saint John the Divine, now in course of construction, will, when completed, rank as one of the great cathedrals of the world. A notable departure from the Gothic style is seen in Trinity Church, Boston, where the Romanesque has been employed with great artistic success.

Every one of the group of subjects referred to occupies a relationship more or less intimate to the others. A modern building is something more than merely the walls and roof. It includes the products of trades that a century ago had no existence, others that have lived less than half a century, and still others that less than a quarter a century ago were unknown. With the growth of population the number of buildings proportionately increases. In our great cities many families living independently of one another occupy together a single building, while the former rule was one family to a house. New conditions of living have arisen, not merely for the poor in tenement houses, but for the well-to-do and affluent, in the aggregation of many homes under one roof. Increasing the size of buildings vertically instead of horizontally called for the working out of new problems not only in engineering but in sanitary science. American ingenuity and skill have, however, kept pace with every requirement or necessity. The achievements and progress in every direction which have added so much to the welfare and greatness of our country during the past one hundred years have nowhere been more marked than in the materials used and the knowledge of their proper applications in the construction of buildings.

WILLIAM H. JACKSON,

Pres. Jackson Architectural Iron Works, N. Y.

Building Societies. See BUILDING AND LOAN ASSOCIATIONS.

Building Stone, stone suitable for building construction. The best building stones are found among crystalline silicious rocks, such as granite for example; among calcareous rocks, which include the various limestones and marbles; or among fragmentary rocks, such as slates and sandstones. To be available for purposes of construction, a stone should possess certain physical and chemical properties; such as durability, permanency of color, crushing strength, elasticity, and cheapness, and should be easily quarried. Stones vary greatly in their durability, depending upon their chemical composition and the particular purposes for which they are used. As soon as a stone is quarried, it becomes exposed to changes in temperature, causing expansion and contraction of its particles and ending ultimately in its disintegration; to the chemical action of rain and atmosphere; and to frost and various mechanical forces, all tending to weaken it.

Granite.—The best building stones have a compact formation, are not susceptible of chemical changes, and are easily worked. Granite comes nearest to perfection in this line. It is the strongest stone in use, and, having been employed for ages, is found to withstand severer tests than any other stone. It is a very hard silicious rock, having a massive and granular crystalline structure, containing the minerals

quartz, feldspar, mica, hornblende, and, occasionally, a little iron. The general color is gray, due to the presence of black mica or hornblende in the white quartz and feldspar. The red and pink varieties are caused by the presence of a red feldspar. The greatest granite beds in the United States are found in Maine and Massachusetts. These granites are chiefly gray. A large amount of red granite is quarried in Nova Scotia, Scotland, and Sweden.

Limestone.—Next to granite, the most durable building stones are the limestones. These vary greatly in both structure and color. Marble and chalk are the purest limestones, but it will be convenient to notice first those more or less composite limestones which are sufficiently hard and strong for building, yet not highly crystalline like marble. One of the best varieties of this stone is the Indiana limestone. It has a white or cream color, is of fine granular structure, and is readily worked. Many of the largest buildings in New York and Chicago are built of this stone. One of the best English building stones is the dolomite, or magnesian limestone of the Permian formation, which ranges from Nottingham to Tynemouth. It is a double carbonate of lime and magnesia, containing a varying proportion of silica. The Houses of Parliament are built of this dolomite, which unfortunately decays rapidly under the influence of the London atmosphere. Among ancient buildings, some parts of York Minster show its perishable nature. Yet in Conishorrough Castle, built in the 12th century, and in some country churches nearly as old, it has stood the effects of time very well.

Marble.—Marble is a purer grade of limestone, of a finely crystallized structure. It is composed almost entirely of calcium carbonate. Its color varies from a pure white to a black, and it often occurs with a red, yellow, or brown color. These colors are due to the presence of carbonaceous matter and iron oxides. Marbles occur in the United States in the beds of the Silurian limestone, which border the Appalachian Mountains, and also in the Rocky Mountains. The best grades are quarried in Vermont, and a very good marble for building use is found in western Massachusetts and in Connecticut. In Europe, the principal sources of marble are Northern Italy, France, Spain, and Portugal. The Numidian marble from Algeria has an international reputation.

Sandstone.—Sandstones are composed of consolidated sand, and vary in color, structure, and composition. They are, as a rule, composed principally of quartz, some English sandstones containing as much as 97 per cent. The other substances they contain are chiefly carbonate of lime, alumina, and oxide of iron. It is hardly possible to tell a good sandstone merely by chemical analysis. A hard, non-porous stone is, of course, more likely to be lasting than one which is soft and porous. In color they vary from a gray, through buff and red, to brown; this coloration being due to the presence of iron as an oxide or carbonate. The sandstones mostly used in the United States are the Ohio freestones, or Berea grits, from the Subcarboniferous formation of Ohio, and the red and brown freestones of Triassic formation on the Atlantic coast. A blue-gray sandstone, containing a large amount of alumina, occurs in New York State, and, on account of

BUILDING OF THE SHIP—BULAMA

its thin stratification, it is split in slabs and used for flagging purposes.

Serpentine.—This stone is composed of silica and magnesium in about equal portions. It is a greenish color and of massive structure. It is rather soft, and is not very durable; but is used to a large extent in interiors and in the trimmings of churches and other places where a pleasing color effect is desired.

Trap.—Trap, or basalt, is one of the most durable stones known; but, on account of its extreme hardness, is little used in building. It is of igneous origin, and will withstand great changes in temperature and extreme frost. It ranges from gray to black in color, is massive in structure, very heavy, and of irregular cleavage. It occurs in almost all parts of the world, and is used to a considerable extent in the United States in the building of asylums, prisons, and other State institutions. Its sombre color seems to make it quite appropriate for this purpose.

Besides these commoner stones, many others are employed for interior and ornamental work, among them various colored slates, onyx, alabaster, and a great variety of artificial stone, brick, and tile. Government reports show the value of the best known building stones quarried in the United States to be some \$50,000,000 annually. Consult: Hall, 'Treatise on the Building and Ornamental Stones of Great Britain' (1872); Merrill, 'Stones for Building and Decoration' (1891); Johnson, 'The Materials of Construction' (1899).

Building of the Ship. The, a well-known poem by Longfellow, published in 1849.

Builth, booth, a small town of Wales, in Brecknockshire, situated on the Wye, in the midst of some of the finest mountain scenery of South Wales. The parish church is a building in the Norman style, with a tower of the 14th century. It was probably the Roman station *Bullaum*, and Roman relics are yet occasionally discovered there. Llewellyn, the last Welsh prince, was slain in the neighborhood in an engagement between the Welsh and English. There are here remains of an old castle surrounded by a moat. Builth has mineral springs which are much frequented. Pop. (1901) 1805.

Buisson, Ferdinand Edouard, fār-dē-nōñ ā-doo-ār bwē-sōñ, French educational administrator: b. Paris, 20 Dec. 1841. After completing his studies at Paris he went to Neuchâtel, Switzerland, where he taught from 1866 to 1870. His appointment by Jules Simon in 1871 as inspector of elementary schools aroused much agitation on account of his advocacy of the secularization of the schools. The opposition of the Church party led to his resignation. In 1873 he was sent to the exposition in Vienna, to represent French educational interests; in 1876 he came to Philadelphia on a similar mission, and in 1878 was in charge of the educational section of the Paris Exposition. In 1879 he was made director of elementary instruction and became prominent for the reforms introduced during his administration. After resigning from this post in 1896 he accepted the professorship of pedagogy in the *Faculté des Lettres*. His strong stand on the Dreyfus question attracted much attention. He is the author of an authoritative 'Dictionary of Ped-

gogy' (1882-4), and has also written 'Liberal Christianity'; 'Orthodoxy and the Gospel in the Reformed Church'; 'The Teaching of Sacred History in Primary Schools'; 'Duties of American Scholars'; 'Pedagogical Lectures and Talks'; and a life of Sébastien Castellion.

Buitenzorg, boi-tên-zörg ("without care"), a favorite residential town in the island of Java, about 40 miles south of Batavia, with which it is connected by rail. It contains a fine palace of the governor-general, celebrated botanic gardens, etc. It has great natural beauty; its elevated location renders it an unusually healthy town, and it is moreover the fashionable summer resort of the island.

Bujalance, boo-hā-lăn-thā, a city of Spain, in Andalusia, 21 miles east by north of Cordova, on an elevated plain in a mountainous district. It has a city wall and moat, contains a Moorish castle dating from 935 and a college. Its manufactures include cloth and woolen fabrics, earthenware, and glass, and it exports wheat, oil, and industrial produce, and imports wool. A large cattle fair is held in August and September. Pop. (1900) 11,245.

Bukowina, boo-kō-vē'nā ("beech land"), Austria-Hungary, a province in the extreme east of the empire, surrounded by Galicia, Russia, Moldavia, and Hungary. Area, 4,035 square miles. It is traversed by offsets of the Carpathians, culminating at 6,077 feet; gives rise to many rivers flowing toward the Black Sea; and abounds in wood, along with considerable mineral riches. Pop. (1900) 729,921, of whom 42 per cent are Ruthenians, 32 Moldavians, and 13 Jews, while 70 per cent belong to the Greek Church.

Bul-tso ("borax lake"), Thibet, a lake situated 100 miles northwest of Lassa. It has an area of 24 square miles.

Bulacan, boo-lā-kan', Philippines, a town in Luzon, about 22 miles northwest of Manila, with which it is connected by railway. The town is composed mainly of native huts, although there are factories in which silk matting is made. Sugar-boiling is also an industry of importance. The place has strategic advantages, which caused it to become a theatre of military operations after the Spanish-American war. It was fully pacified in 1900, and made a military post by the United States authorities. Pop. about 14,000.

Bulak, boo-lāk', or **Boulac,** Egypt, the port of Cairo, on the Nile, about one mile distant from that city. It is irregularly built, and contains a custom-house, a fine palace, a school of languages, a celebrated printing-office, set up by Mehemet Ali in 1822, a large bazaar, etc. Goods are brought here from many parts of northeastern Africa, and the Cairo merchants come here every morning to make purchases. Its narrow streets present a busy and characteristically Oriental scene. Pop. about 13,000.

Bulama, boo-lā'ma, an island on the west coast of Africa, one of the Bissagos. It is 18 miles long and 9 broad, and is situated about two miles from the mouth of the Rio Grande. It is very fertile, but not easy of access. The Bulama Association of Great Britain attempted to colonize it in 1792, but it was soon abandoned. It is now occupied by the Portuguese. See BISSAGOS.

BULAN — BULGARIA

Bulan, boo-län, Philippines, a town of the province of Albay, situated in the southeastern part of the island of Luzon. Pop. about 11,000.

Bulau, boo'low, or **Tikus**, ti'koos, an animal of the mole family (*Talpidae*) and genus *Gymnura* (*G. rafflesii*), a native of Sumatra and Malacca, bearing a considerable resemblance to the opossum. The muzzle is much prolonged, the fur pierced by a number of long hairs or bristles, and the tail naked. It is possessed of glands which secrete a kind of musk.

Bulawayo, boo-lä-wä'yō, Rhodesia, the principal town and chief commercial centre of Matabeleland, South Africa, 400 miles north-east of Mafeking, 1,360 miles from Cape Town, with which it is connected by railroad. It has several hotels, good business blocks and residences, banks, and telephone service, and is rapidly growing in size and importance. A few years ago it was the chief town of the Matabele tribe, though only a collection of rude huts, in an enclosure of wattles, whose inhabitants were savages of the lowest type. The royal kraal is now replaced by the government house, which communicates by an avenue a mile and a half long with the town proper. Pop. (white) about 5,000.

Bulb, the name given to a leaf bud belonging to certain perennial herbaceous plants, and particularly to the monocotyledons. It is always underground, and is supported by a kind of solid and horizontal plate lying between it and the true root. To this flattened portion the fleshy scales of which the bulb is externally formed are fixed by their base. The interior contains the rudiments of the flower-stalks and leaves. The outermost scales are thin and dry like paper, but they become more fleshy and succulent in the interior. Sometimes the scales are of one piece, a single scale embracing the whole circumference of the bulb, as in the onion and the hyacinth. They are then named "coated" or "tunicated bulbs." At other times the scales are smaller and free at the sides, and cover one another only in the manner of tiles on a roof, as in the white lily. Lastly, the coats are sometimes so close as to be confounded together, so that the bulb seems as if formed of a solid and homogeneous substance. Such bulbs are called "solid," and they are exemplified in the common saffron. Bulbs again are either "simple," as in the tulip or squill, or they are "multiple," or formed of several small bulbs collected under the same envelope, as in garlic. Bulbs are reproduced every year, but differently in different species, the new bulbs sometimes being formed in the centre, sometimes at the side, sometimes above, sometimes below the old bulbs.

Bulbul, bül'bül, a small, brilliantly plumaged thrush-like bird of the family *Pycnonotidae*, species of which are found in Asia, Persia, India, and South Africa. The South African one (*Pycnonotus tricolor*) is remarkable for becoming intoxicated by syringa berries and similar fruits, at which time it is easily captured and caged. The common Indian bulbul (*P. hamorrhous*) is a familiar and favorite bird of European residents, and often builds its nest in their gardens and on the verandas. The pugnacity of the males is utilized by the

natives for their amusement, the birds being caught and trained to fight for small prizes. The name "bulbul" was applied to the little Persian nightingale (q.v.), and first introduced into English poetry by Lord Byron, after which its praises were much sung by the poets of the day.

Bulfinch, Charles, American architect: b. Boston, 8 Aug. 1763; d. there, 15 April 1844. He was graduated from Harvard in 1781, for several years traveled in Europe, studying architecture, which he adopted as a profession upon his return in 1786. In 1793 he built the first theatre in Boston. In the course of his career he designed more than 40 churches and public buildings in New England. Among them were: the State house, Suffolk county courthouse, Massachusetts General Hospital, and remodeled Faneuil Hall in Boston; the State prison and MacLean Asylum, at Charlestown; the county jail and University Hall in Cambridge; and the State house in Augusta, Me. From 1817 until its completion in 1830 he was the architect of the national capitol at Washington. Consult: Ellen Bulfinch, 'Life and Letters of Charles Bulfinch, Architect' (1866).

Bulfinch, Thomas, American author: b. Boston, Mass., 15 July 1796; d. there, 27 May 1867. He graduated at Harvard University in 1814. Although engaged in business he managed to devote considerable time to literature. Among his best-known works are 'The Age of Fable' (1855); 'The Age of Chivalry' (1858); 'Legends of Charlemagne' (1864); 'Oregon and Eldorado' (1866).

Bulgaria, bül-gär'ëa, or bool-gär'ëa, a principality in Europe, bounded north by the Danube and Rumania; east by the Black Sea; south by Turkey; and west by Servia; capital, Sofia. It has an area of 38,080 square miles. Its surface is a gradually sloping plain, broken by occasional mountains, which give rise to many rapid tributaries to the Danube. There is little mining, although the mountains are rich in minerals. The soil is excellent and the slopes of the mountains are richly wooded. The inhabitants, though not skilled in agriculture, export a considerable quantity of grain, chiefly wheat. Fruit and vegetables are raised in abundance. Roses are largely cultivated for the production of the attar; 80,000 gallons of wine are made annually; silk worms are bred in some regions; and tobacco forms an important crop. Domestic industries are chiefly carpets, cloths, hosiery, and ribbons. The roads are very bad, and there is but a single line of railroad, about 500 miles, on the route between Vienna and Constantinople. All traffic is carried on by the rivers, and the export trade by the Black Sea. The government is Christian. There is a national militia, and military service is compulsory. The Bulgarians were originally a Tartar nation, which in the 4th century was settled on the Volga. The ruins of their former capital may still be seen in the neighborhood of Kazan. Their kingdom, which occupied a part of the Asiatic Sarmatia of the Greeks, was called Great Bulgaria, and is now comprehended in the Russian government of Orenburg. They afterward removed to the countries between the Bog and the Danube, and called their territories Second Bulgaria. The first Bulgarian kingdom south of the Danube was founded in the latter

half of the 7th century, but the Bulgarians who established it were comparatively few in number, and after their adoption of Christianity in the 9th century they became completely mixed up with the Slavonic inhabitants, though the whole became known as Bulgarians. The greatest ruler of this kingdom was Symeon (888-927), who subjugated the greater part of the peninsula, and raised the Archbishop of Bulgaria to a position independent of the Patriarch of Constantinople. Under the son of Symeon this empire fell to pieces. The western half broke off and formed a separate kingdom, with Ochrida in Macedonia for its capital; and the eastern portion was subdued by the Byzantine emperor, John Zimisce, who reincorporated it with the empire. The western Bulgarian kingdom existed only till about 1018, when it also was subdued by Basil II., "the slayer of the Bulgarians." Toward the end of the 12th century, however, the Bulgarians revolted and managed to establish a third kingdom between the Balkan range and the Danube, which, sometimes weak and sometimes powerful, continued to exist till the advent of the Turks. The last ruler of this kingdom was conquered by Bajazet I. about 1390, and for nearly 500 years the Turks ruled supreme. In 1876, on account of the atrocities of the Turkish soldiers, an insurrection broke out. Russia took the part of Bulgaria against Turkey, and the war of 1877-8 followed. (See BATAK.) By the first article of the Treaty of Berlin, 13 July 1878, the principality of Bulgaria was constituted, made tributary to Turkey, and placed under the suzerainty of the Sultan. In 1879, Alexander of Battenberg, a German prince, was chosen sovereign of part of Bulgaria, the rest being made a separate province called East Rumelia, to prevent Bulgaria from becoming a strong state. In 1885 there was a revolution in East Rumelia, which annexed itself to Bulgaria. Serbia intervened, and Alexander was forced to abdicate. Against Russia's will, Ferdinand of Saxe-Coburg accepted the vacant throne in 1887. The government is that of a hereditary prince as chief executive, with responsible ministers and Legislative Assembly (one for every 10,000), elected directly by the people for three years; it pays annual tribute to the Sultan. Pop. (1900) 3,733,189; about 74 per cent Bulgarians, 19 per cent Turks, the rest Spanish Jews, with a sprinkling of Greeks; 77 per cent are of the faith of the Orthodox Greek Church; only 2½ per cent Moslems.

Bulgarian Language and Literature. Bulgaria and the adjacent provinces of Macedonia are considered to have been the cradle of the old Slavic languages. The ancient Bulgarian language was the richest of them all, and was the scriptural language of the Greek-Slavic Church, and the great medium of ecclesiastical literature in the ancient Slavic lands. The Russian language is said to have been molded by missionaries of the Greek Church sent from Bulgaria about the 11th century, while the future empire was still in a state of semi-barbarism. The Russian tongue has preserved many inflections which the Bulgarian has lost. After the overthrow of the Bulgarian kingdom at the close of the 14th century, the grammatical structure and purity of the language became impaired by mixture with the Wallachian, Alba-

nian, Rumanian, Turco-Tartar, and perhaps Greek vernaculars; and the modern Bulgarian language has only the nominative and vocative of the seven Slavic cases, all the rest being supplied by prepositions. It has an article, which is put after the word it qualifies, like that of the Albanians and Wallachians. Among the ancient Bulgarian ecclesiastical literature must be mentioned the translations of the Bible by Cyril and Methodius, and the writings of John of Burgary in the 10th century. Grammars of the Bulgarian language have been published by Neofyt in 1835, and by Christiaki in the following year. Venelin, a young Russian scholar, sent to Bulgaria by the Russian archæographical commission, published in 1837 a grammar and two volumes of a history of the Bulgarians, but died while he was engaged in preparing a third volume. A new grammar was given to the public by Bogojev in 1845, and finally in 1849, by the Rev. E. Riggs, an American missionary stationed at Smyrna, who also sent a Bulgarian translation of Gallaudet's 'Child's Book on the Soul' to New York. Dictionaries of the Bulgarian language have been compiled by Neofyt and Stojanowicz. A Bulgarian version of the New Testament was printed at Smyrna in 1840 for the British and Foreign Bible Society. The Bulgarian national songs are numerous, and are similar to those of the Servians. Czelakowsky's collection of Slavic songs contains a number of Bulgarian songs. Bogojev has published several historical poems. Among more recent writers may be mentioned the poet Christo Boteff, and the poet-novelist Ivan Vazoff, while a publication on the subject of education has appeared from the pen of Neofyt.

Bulgarin, Faddēi Venediktovich, fa-dā'ē vā-nā-dik'tō-vich bool'gar-in, Russian author: b. Minsk, 1789; d. 13 Sept. 1859. He served in the Russian army, but, finding himself neglected, in 1810 joined Napoleon. In 1819 he returned to St. Petersburg, where his writings soon attracted notice by their intense satire and servility. In 1825 he started the *Ssčernaja Ptchelá* (*Northern Bee*), a daily paper, which for long was alone permitted to discuss political questions. A zealous supporter of reaction and of absolutism, he enjoyed, through relations with the secret police, an unlimited power. He was a witty and versatile writer, and published travels, histories, novels, and statistical works.

Bulgaris, bool-gä'rēs, Demetrius, Greek statesman: b. Hydra, 1803; d. Athens, 11 Jan. 1878. While a young man he held office in his native city and took a prominent part in the Grecian war for independence. In 1831, after the downfall of Cape d'Istria, he had charge of the administration of the Department of Marine; but on the accession of King Otho he retired from office. After the revolution of 1843 he was a member of the Senate, and from 1848 to 1849 was minister of finance in the Cabinet of Canaris. During the Crimean war he was at the head of the Cabinet and as minister of the interior put an end to internal disorder and conciliated the powers. In 1857 he resigned and entered the Senate as a leader of the opposition. At the outbreak of the revolution of 1862 he was made regent, and chose Canaris and Rufos as his colleagues, but was deposed by the former. In 1865, 1872, and 1874-5 he was again at the head of the Cabinet.

Bulga'rus, Italian jurist: b. Bologna in the 11th century; d. 1166. He was one of the famous group of writers known as the "Four Doctors" of Bologna, and his most noted work is a legal commentary, 'De Regulis Juris.'

Bulim'ia, a disease characterized by insatiable hunger. Persons suffering from this disorder are never satisfied. When the stomach is surfeited they throw off the food they have taken, half-digested, and with violent pain. It frequently occurs in the insane, in cases of paresis, etc., and usually appears as a concomitant of other diseases, as certain intermittent fevers, and diseases of the stomach and bowels, particularly such as are produced by the tapeworm.

Buli'mus, a genus of land-snails of the family *Helicida*, the species of which are mainly restricted to South America, especially Peru, Ecuador, and Bolivia. Some of the species are very large, as are also their eggs, those of *B. oblongus* being about the size of a sparrow's. There is an egg of another species in the British Museum which measures exactly one and three fourths inches in length.

Bulkeley, Morgan Gardner, American politician: b. East Haddam, Conn., 26 Dec. 1837. At the age of 15 he entered a mercantile house in Brooklyn, N. Y., and in a few years became a partner in it. When the Civil War broke out he went to the front as a private in the 13th New York regiment, and served during the McClellan-Penninsula campaign under Gen. Mansfield at Suffolk, Va. In 1872, he came to Hartford, organized and became president of the United States Bank in that city, and later was elected president of the Aetna Life Insurance Company, a position he still holds (1903). For 30 years he has been a prominent figure in local and state politics. He was four times elected mayor of Hartford, 1880-8, and in 1889 was elected governor. At the State election in November 1890 the first gubernatorial election under the new secret ballot law, the Democratic ticket received a considerable plurality over the Republican ticket; but a majority being necessary to elect, there was some doubt whether there had been a choice by the people for governor or treasurer. Accordingly the matter went before the General Assembly, which met in January 1891, and in which the Republicans had a majority of four on joint ballot, the Senate being Democratic. A long contest ensued between the two Houses, the Senate claiming the election of the recent Democratic candidates, and refusing to recognize in any manner Governor Bulkeley and the other hold-over Republican officials. The matter was finally settled on 5 Jan. 1892, when the State supreme court, in the *quo warranto* suit brought against Governor Bulkeley by the Democratic candidate for governor, found "Morgan G. Bulkeley to be governor, both *de facto* and *de jure*," and his right to hold over till both houses of the General Assembly should unite in declaring the election of his successor was affirmed. As the two houses could not agree the governor remained in office for another full term. In November 1892 the Democratic ticket swept the State. Governor Bulkeley has since, as chairman of the Connecticut highway and bridge commission, interested himself earnestly in trying to procure a fine stone bridge across the Connecticut at Hartford.

Bulkeley, Peter, American colonist and clergyman: b. Bedfordshire, England, 31 Jan. 1583; d. Concord, Mass., 9 March 1659. He was educated at Cambridge, and for 21 years was rector of a Bedfordshire parish. Being removed from this by Archbishop Laud, for non-conformity to certain ceremonies of the Church, he left England and became the first minister at Concord, in the colony of Massachusetts, of which famous town he was the chief founder. He was the author of some Latin poems, which are contained in Cotton Mather's 'History of New England'; also of some English verse, and of a theological treatise, 'The Gospel Covenant Opened,' published in London in 1646. He was as remarkable for his benevolence and kind dealings as for the strictness of his virtues.

Bulk'head, the name given to a variety of forms of partition. In its nautical sense a bulkhead is a wall or partition extending across the ship for the purpose of dividing the hold into compartments, for separating classes of merchandise, for strengthening the vessel, or more especially for confining water which may leak in, to the compartment in which the breach occurred. In large vessels longitudinal bulkheads are employed, as well as those running athwartships, and communications between the compartments are maintained by means of doors which can be instantly closed in case of accident and for the purpose of maintaining forced draught. One of the most important bulkheads in a ship is the one farthest forward, which is built with great strength, being designed to withstand the shock of ramming another vessel, an iceberg, etc., and confining the damage to a small portion of the vessel. It is hence known as the collision bulkhead. Another form of bulkhead is a strong framework used in the construction of tunnels, to prevent the irruption of water, quicksand, etc., into the workings. The term is also applied to the facing (generally of timber) that supports the seawall of a harbor, and somewhat illogically to the sloping flap doors often used to cover the entrance of a dwelling-house cellar.

Bull, Charles Stedman, American physician. He was graduated from Columbia College in 1864, and at the College of Physicians and Surgeons in 1868. He is surgeon to the New York Eye and Ear Infirmary, consulting ophthalmic surgeon to St. Luke's and Presbyterian hospitals, and St. Mary's Hospital for Children. He is professor of ophthalmology in Cornell University. He has written: 'Eye Defects Which May Cause Apparent Mental Dulness and Deficiency in Children' (1901); 'Tuberculosis of the Eye' (1900); both in the 'Transactions' of the New York Academy of Medicine; 'Vascular Tumors of the Orbit' (1900), and other articles on his specialty in the 'Transactions' of the American Ophthalmological Society, the 'Medical News' and 'Medical Record.'

Bull, George, English bishop: b. Wells, Somersetshire, 25 March 1634; d. 17 Feb. 1710. Having graduated with distinction at Oxford, he was ordained at the early age of 21, and soon became rector of St. George's, near Bristol. Here he made himself beloved by all, and kept his parish in peace during those troublesome times. In 1658 he became rector of Sud-

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dington St. Mary's in Gloucester, and in 1662, of Suddington St. Peter's. In 1669 he published in the Latin tongue his most important work, called 'Harmonia Apostolica,' an attempt to reconcile the apparent contradictions between St. James and St. Paul on the doctrine of justification. This publication extended his fame to foreign countries, and his reputation procured him a stall in the cathedral of Gloucester. In 1705 he was promoted to the bishopric of St. David's. See edition of his works, with a life, etc., Clarendon Press, Oxford (1827).

Bull, George Joseph, Canadian ophthalmic surgeon: b. Hamilton, Ontario, 16 Feb. 1848. He was graduated at McGill University in 1869, studied in Paris, and began the practice of medicine in Montreal, devoting himself especially to diseases of the eye. He made his residence in Paris in 1886, and has won celebrity as an expert in ophthalmic subjects. He has written 'Ophthalmia and Optometry,' and many similar works.

Bull, John, English musician: b. Somersetshire, about 1563; d. Antwerp, 12 March 1628. He was appointed organist in the Queen's Chapel in 1591; first music lecturer at Gresham College in 1596; and organist to James I. in 1607. A Catholic, he fled beyond the seas in 1613, and at Brussels entered the archduke's service. In 1617 he became organist at Antwerp cathedral. Little of his music has been printed. The claim advanced for his authorship of 'God Save the King,' is unfounded.

Bull, John, the popular name of personification for the English nation. Its origin is obscure. Its first literary use appears to have been in Arbuthnot's famous 'History of John Bull,' written in ridicule of the Duke of Marlborough. The name is also used for an Englishman.

Bull, Ole Bornemann, ò-lē bôr'ne-mån bŭl, Norwegian violinist: b. Bergen, 5 Feb. 1810; d. near there, 17 Aug. 1880. He secured great triumphs both throughout Europe and in America by his remarkable playing, which won for him a distinct and unique position in the musical world as a virtuoso of extraordinary talent and mastery of the violin. He conquered serious discouragements in preparing for his career, throughout which public interest and admiration were no less awakened by his manliness and grace of bearing than by his skill as a musician. At his début (Paris 1833) he was honored by the presence of Paganini, and that master was witness to the young aspirant's triumph. Bull afterward studied and turned to good account the method of Paganini. In business life he met with various successes and reverses. He lost all his money in a scheme to found a colony of his countrymen in Pennsylvania, and had to take to his violin to repair his broken fortunes. He afterward married in this country, settled at Cambridge, Mass., and retained a summer residence in Norway. Consult: 'Ole Bull: A Memoir' by Sara C. Bull (Boston 1883).

Bull, Papal, an authoritative letter issued by the Roman pontiff acting in his official capacity as head of the Church. A Papal Brief is also an official letter of the pontiff of a less formal and weighty character, and differs in

sundry particulars from the Bull, especially in its seal. The seal of the Bull, from which comes the name of the instrument is a *bull* or globular mass of lead on which is impressed the name of the reigning Pope, also those of Saints Peter and Paul, abbreviated, S. Pe, S. Pa. The material of the Bull is parchment, but of the Brief, white paper; and the seal of the Brief is of red wax, stamped with the Fisherman's Ring, which gives the impress of St. Peter in a boat fishing. There are other peculiarities in matter and manner distinguishing the Bull from the Brief, but it suffices to note the foregoing. Of Papal Bulls that have played a signal part in history ecclesiastical or civil especially worthy of mention are the Bull *Clericis laicos* (1296) of Boniface VIII. by which the French clergy were forbidden to pay taxes to King Philip the Fair unless these were approved by the Pope; the Bull *Exsurge Domine* of Leo X. against Martin Luther (1520); the Bull *In Coena Domini* against heretics and fautors of heresy, dating from the 15th century, but re-enforced by Pius V. in 1571 and ordered to be publicly read in all parish churches yearly on Holy Thursday; the Bull *Unigenitus* (1713) against quietism and Jansenism; the Bull *Dominus ac Redemptor*, of Clement XIV., abolishing the Jesuit order (1773), and the Bull *Pastor aeternus* (1870), which defined papal infallibility.

Bull, a ludicrous speech in which the ideas combined are totally incongruous or contradictory. A good example is Artemus Ward's saying of Jefferson Davis that "It would have been money in Jefferson Davis's pocket if he had never been born."

Bull and Cow, the names given by English-speaking races from time immemorial to the male and female respectively of bovine cattle. The words are probably imitative, the root-idea of "bull" being a suggestion of its bellowing; while "cow"—which in early English, as yet in Scotch and some provincial dialects, is pronounced *coo*—is imitative of the lowing call to the calf. Since these animals have become domesticated, and most of the males been castrated, the term has come to mean more particularly an unmutated ox. On the other hand, the large size and robust qualities of the bull have led to a transference of the term to the males of various other animals having no zoological resemblance, or very little, to the cattle. Thus we speak of "bull and cow" elephants, moose, wapiti, seals, whales, and even alligators; while various animals, as the bull-snake take the name as expressive of some bull-like quality, as a habit of snorting, or because of horn-like appendages (for example, bullhead catfish).

Bull-baiting, the sport of setting dogs on a bull, which was tied to a stake and torn to death for the amusement of the spectators. In this case the dogs, which were set upon the bull singly, were trained to seize the bull by the muzzle, technically, "to pin" the bull; but they were very frequently tossed on the horns of the animal. Sometimes also the bull was allowed to run loose in the arena, and then several dogs were set upon him at once. Bull-baiting was a favorite sport in England till about the time of George IV.

BULL-DOG—BULL RUN

Bull-dog, a dog of moderate size, derived previous to the 13th century, from a cross between the old British mastiff and the large pug of extreme southeast Asia. Both its ancestors still exist as separate breeds. An average mature specimen will weigh 40 to 50 pounds. They are squat and muscular in build, with short legs, rather higher behind than in the front, especially if the front legs are very much bowed. Their chests and heads are abnormally broad for their size. The lower jaw overlaps the upper and is of extraordinary strength. The teeth are large, especially the two canines, and very strongly fixed in the jawbone, giving the dog a holding power beyond that of any other breed. The coat is close and short. The most variable feature is the color, which ranges from all black to all white among dogs bred for show purposes, but a brindle is more natural. For many centuries this dog was used for "baiting," or biting at, the bull, as a popular recreation; and up to more recent times men of brutal disposition used it for public dog-fights. It was through these exhibitions that the bull-dog got his bad name for temper, but now he is mainly kept as a watch-dog. In that capacity he is invaluable, and so gentle is his disposition that he is the safest canine companion for children. About the year 1900 a small variety of the bull-dog was evolved in the neighborhood of Brussels, but as it was first shown in Paris it has always been known as the "French" bull-dog. It is in the main a miniature of the English bull-dog. The most notable difference, other than that of size, being that the ears are shaped like those of a bat, and are carried erect, or "pricked," giving the animal a very alert, sharp look.

Bull-fight, a contest between men and bulls, conducted as a public spectacle. Once popular in Greece and Rome, this form of entertainment was introduced by the Moors into Spain, and universally adopted in the cities of the kingdom, where, as well as in Mexico and some other parts of the world, it is still much in favor. The bull-fight is held in an arena of greater or less magnificence, called in Spanish the *plaza de toros*. The bulls are turned out, one by one, with many forms of pomp and solemn ceremonial, into the open space, where they are assailed, first by horsemen, called *pica-dores*, who attack them with the lance; then, when one or more horses have been wounded, and one or more men have met with injury or perilous mishap—in which case a crowd of active footmen, called *chulos*, provided with crimson banners, take off the attention of the bull—the *banderilleros*, armed with sharp-barbed darts with fireworks and flags attached to them, worry the bull until he is covered with shafts, bleeding and scorched, his glossy hide black and crisp from the explosion of the fireworks. Then comes the last act of the tragedy, when the skilful *matador* enters the arena slowly and alone, clothed in plain black, and armed with a long, straight sword and a stick, called a *muleta*, with a piece of red silk fastened to it. With his sword he seldom fails to give the *coup de grace* to the tortured bull, sheathing the blade, with one sure thrust, up to the hilt in his body just at the juncture of the neck and spine. Mules drag out the slaughtered carcass, amid the sound of trumpets and acclamations

of the spectators; the dead or dying horses are removed; the arena is strewn with fresh sawdust; another bull is introduced; and so goes on the combat, until perhaps a score of bulls and a larger number of horses have been slaughtered to delight the spectators. The Spanish settlers of Mexico and South America introduced bull-fighting to the New World.

Bull-frog, a widely distributed, edible North American frog (*Rana catesbyana*) found in sluggish waters throughout the eastern half of the United States and Canada, and so called because of its loud, bass voice. It is from five to eight inches long, and of various shades of green, with the legs spotted. It lays its eggs in strings and the tadpole does not reach maturity until two years old. The same name is given by English-speaking people in various parts of the world to other large bellowing frogs, as the "bull-frog" of Siam and Malaya (*Callula pulchra*). See FROG.

Bull, Golden. See GOLDEN BULL.

Bull Run, First Battle of. The first great battle of the Civil War occurred Sunday, 21 July 1861, in the vicinity of Manassas, Va. The Union forces were commanded by Brig.-Gen. Irvin McDowell, the Confederates by Gen. Joseph E. Johnston, who had arrived from Winchester at noon of the 20th with nine regiments of his army, and assumed command. The battlefield was west of Bull Run, and near the crossing of that stream by the turnpike running nearly west from Alexandria to Warrenton. This road, a mile and a half west of the Stone Bridge by which it crossed Bull Run, unexpectedly to the Confederates, became the axis of the battle. Bull Run is a narrow, winding stream with rugged and mainly precipitous banks, but with numerous fords, flowing southeastwardly, being about 25 miles west of Alexandria, and from three to five miles east of Manassas.

McDowell marched from his camps in front of Arlington and Alexandria on the afternoon 16th July, with five divisions, commanded respectively, by Brig.-Gen. Daniel Tyler, four brigades; Col. David Hunter, two brigades; Col. S. P. Heintzelman, four brigades; Brig.-Gen. Theodore Runyon, two brigades; and Col. Dixon S. Miles, three brigades. The Fourth Division was left as a reserve in the region of Fairfax, guarding the lines of communication. The advance division, Tyler's, reached Centreville the morning of the 18th and sent a brigade to Blackburn's Ford in reconnaissance. After a sharp skirmish in which both sides lost about 60 men, it withdrew toward Centreville, to which point McDowell, hearing of the operations at Blackburn's Ford, directed the concentration of four divisions.

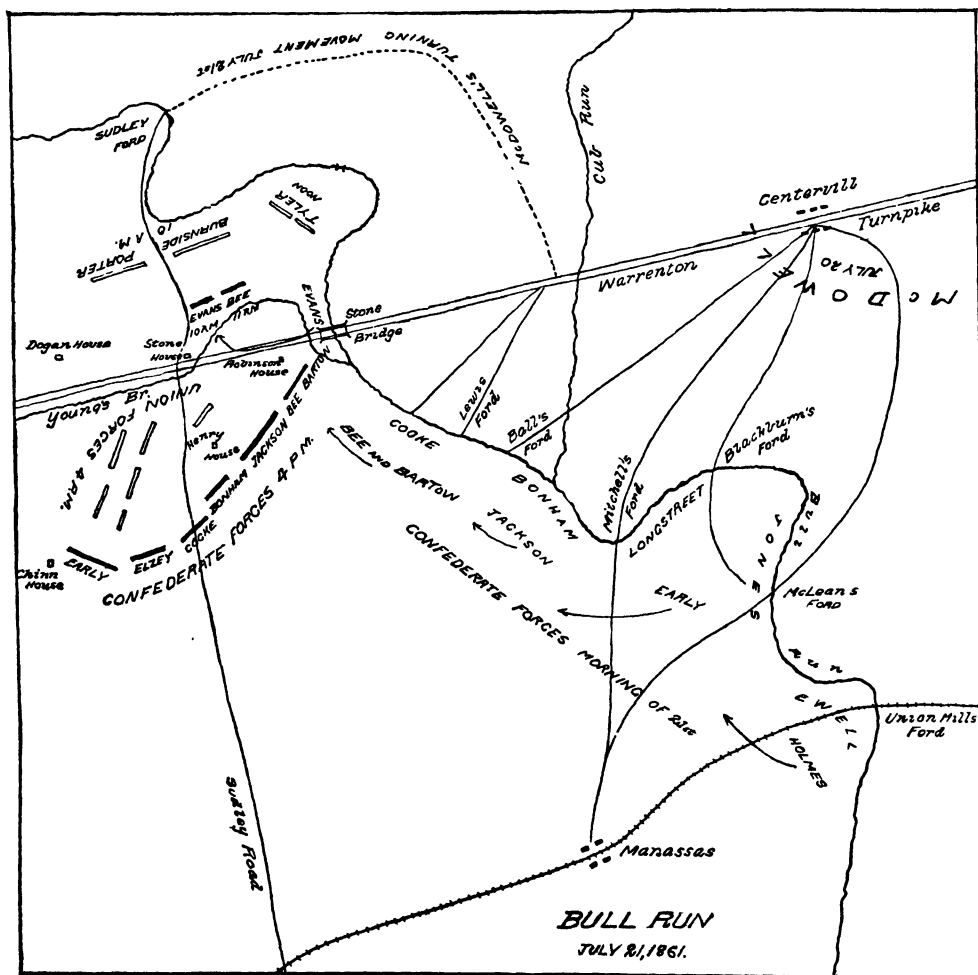
The Confederate "Army of the Potomac" had been concentrated at Manassas under Gen. Beauregard. In expectation of a Union advance it occupied the south bank of Bull Run for eight miles from Union Mills Ford, at the crossing of the railroad to Alexandria, to the Stone Bridge at the Warrenton turnpike, three brigades being thrown forward of that position, one of them to Fairfax Court House. These brigades fell back before the Union advance, skirmishing slightly. Ewell's brigade, the right of the line, was at Union Mills, with Holmes in support; Jones' brigade at McLean's Ford; Longstreet's at Blackburn's Ford; Bonham's be-

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tween Mitchell's and Ball's fords; Cocke's at Lewis' Ford; and Evans' demi-brigade at the Stone Bridge forming the Confederate left. Of Johnston's Army of the Shenandoah, Jackson's brigade was in support of Bonham, and Bee and Bartow in support of Cocke.

From each of these fords fair roads led to Centreville. Gen. Beauregard had planned an attack upon Centreville which involved an advance of his whole force upon that point. This was officially approved by Gen. Johnston before daylight of the 21st, but at sunrise it was rendered impossible by McDowell's initiative. The

bridge, discovering the movement, withdrew 11 companies and formed them on a ridge half a mile north of the road as the head of Hunter's column entered the open fields which extended a mile north of the Warrenton road. Evans made stubborn resistance, and was soon supported by Bee's brigade, and Imboden's battery. While the position was hotly contested the Confederates were pressed back down the hill, across the valley of Young's branch, a tributary of Bull Run, to the plateau south of it upon which were the Robinson and Henry houses. Two of Tyler's brigades crossed above the Stone Bridge



plan was then changed to an attack on the Union left from Blackburn's Ford. This also was abandoned from the same cause.

McDowell, who had first intended to attack the enemy's right, after the affair at Blackburn's Ford, finding the ford at Sudley Spring two miles beyond the Confederate left, decided to attack from that direction. While Tyler feinted before the Stone Bridge, Hunter and Heintzelman, by a long detour, crossed at Sudley Spring and moved south toward the Warrenton turnpike in the enemy's rear. Evans, at the

and joined Hunter and Heintzelman in their advance. The fighting continued desperate until noon, and for new troops was, for both sides, most remarkable, but the Confederate line, though stubbornly contesting the ground, began to disintegrate, and the road to Manassas was crowded with retreating soldiers.

Gen. Johnston describes the Confederate situation at two o'clock as "critical"; Gen. Beauregard terms it a "pressing exigency," and speaks of the retirement of "our shattered battalions," and of the fighting line as having "lost its cohe-

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sion." Dr. Jones, Jackson's distinguished biographer, records that "the retreat became every moment more disordered," that Bee's quick eye "now told him that all was lost," and that "he could not reform his line."

At that hour a Union victory seemed assured. Johnston and Beauregard reached the position together. The troops on the line of Bull Run that had been held there by the demonstrations of two Union brigades designed to mask McDowell's turning movement, were ordered in haste to the new line which was at right angles to the first. Jackson soon arrived with five regiments and two batteries. Hampton's Legion joined him, and the Union advance was checked. Other arrivals strengthened the line. Kirby Smith's brigade of Johnston's army appeared about three o'clock, having just arrived on the field from Manassas, and pushed its three regiments toward the right of the Union line. Early's brigade of Beauregard's force, from the extreme right of his line, hastened beyond Smith's brigade, now commanded by Col. Elzey, and supported by Stuart's cavalry, appeared directly on the Union right flank. Two regiments from Bonham, and two from Coker, also arrived upon the Union right. These also were of Beauregard's army. This turned the check which that portion of the Union line had received, first into retreat, and then into a disorganized withdrawal, except that the rear guards maintained fair order till the columns were well off the field, the right retracing its long detour by Sudley Spring. At Cub Run, half-way to Centreville, the batteries of a pursuing column broke up the wagons and batteries on the bridge, compelling the abandonment of 13 guns. From this point the movement to the rear was still farther disorganized, to which condition the vehicles of many visitors, congressmen, correspondents and officials largely contributed. The attempt to rally the troops at Centreville failed, though Gen. Johnston reported that the "apparent firmness" of the Union reserves at that point checked the pursuit. The army, in great part disorganized, streamed on to Washington.

After the severe stress in which the Confederate leaders found themselves from 11 o'clock until about 3, the sudden change on the Union side, first from assaulting to cessation of fighting; next, to a general retreat, and, later, to widespread panic, was as much a surprise to the enemy as to the Union commanders. It was not until the second day after the battle that the Confederates ascertained the full extent of the Union stampede. Upon this point President Davis wrote Gen. Beauregard: "You will not fail to remember that, so far from knowing that the enemy was routed, a large part of our forces was moved by you in the night of the 21st to repel a supposed attack upon our right, and the next day's operations did not fully reveal what has since been reported of the enemy's panic."

McDowell's strength at Centreville appears to have been about 28,000 men and 49 guns. His report says he crossed Bull Run with 18,000 men. A very careful estimate made from official records in 1884, by Gen. James B. Fry, McDowell's adjutant-general at the battle, gives the number actually engaged as 17,676.

Gen. Beauregard reported his strength on the field when the battle opened at 27,833 and 49 guns; and after Johnston's delayed troops and Holmes' brigade had arrived in the afternoon as

31,972 and 57 guns. A very careful estimate by Gen. Thomas Jordan, his adjutant-general, fixed the number actually engaged at 18,053, thus showing the two sides to have been about equal on the firing line.

The Union loss as reported was: Killed, 460; wounded, 1,124; missing, 1,312; total, 2,896. Union guns captured or abandoned, 29.

The Confederate loss reported was: Killed, 387; wounded, 1,582; missing, 13; total, 1,982.

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Bull Run, Second Battle of, 30 Aug. 1862. When McClellan on the peninsula had reached the vicinity of Richmond, Lee, to prevent McDowell's corps at Fredericksburg from re-inforcing McClellan, ordered Jackson in the Shenandoah to make a demonstration that should detain all available troops for the defense of Washington. Jackson advanced, and in a brilliant campaign drove Banks out of the valley, and forced him across the Potomac. By a masterly retreat, he regained the upper valley in spite of McDowell and Fremont, and soon after appeared on McClellan's flank at Mechanicsville and participated in the seven days' battles.

On 27 June the Union authorities united the three corps of McDowell, Fremont, and Banks into the Army of Virginia under the command of Maj.-Gen. John Pope. He had concentrated his forces between Sperryville and Warrenton, and began to operate with his cavalry against Lee's railroad lines about Gordonsville. His mission also was to prevent Lee from concentrating upon McClellan, when he should withdraw from the peninsula. Lee promptly sent Jackson's Division, followed by Ewell's and A. P. Hill's, to Gordonsville. On 7 August these moved from Gordonsville toward Pope's position at Culpeper, and 9 August encountered Banks at Cedar or Slaughter Mountain. Banks attacked, instead of holding his position as Pope's plan contemplated, and while at first brilliantly successful, he was at last defeated. Jackson, however, retreated on the 11th across the Rapidan.

On the 13th Lee ordered Longstreet, with his own and Hood's divisions, to Gordonsville. R. H. Anderson's division was ordered to follow. Upon their arrival Pope was largely outnumbered. Lee planned a move for the 18th against Pope's left, but this officer learned of the plan through the capture of Stuart's adjutant-general, re-crossed the Rappahannock, and took position behind it on the 20th. Lee next arranged to cross at Sulphur Springs, turn Pope's right, and move upon his communications. This failed. Pope, at the same time, had planned to cross the river and attack Lee's right and rear, but a sudden flood prevented the movement. Lee then sent Jackson's corps far beyond Pope's right by way of Salem and Thoroughfare Gap to cut Pope's railroad line at Manassas. Jackson succeeded, passing around Pope's right, capturing Bristoe Station and Manassas with its immense supplies on the night of 26 August. Pope moved to attack him at Manassas. On the night of the 27th and early on the 28th, Jackson's three divisions withdrew by different roads, and soon after noon of the 28th assembled on the battlefield of the first Bull Run.

On the night of the 25th Pope's headquarters were at Warrenton Junction. Reynolds' Division had joined him on the 23d. On the 25th the

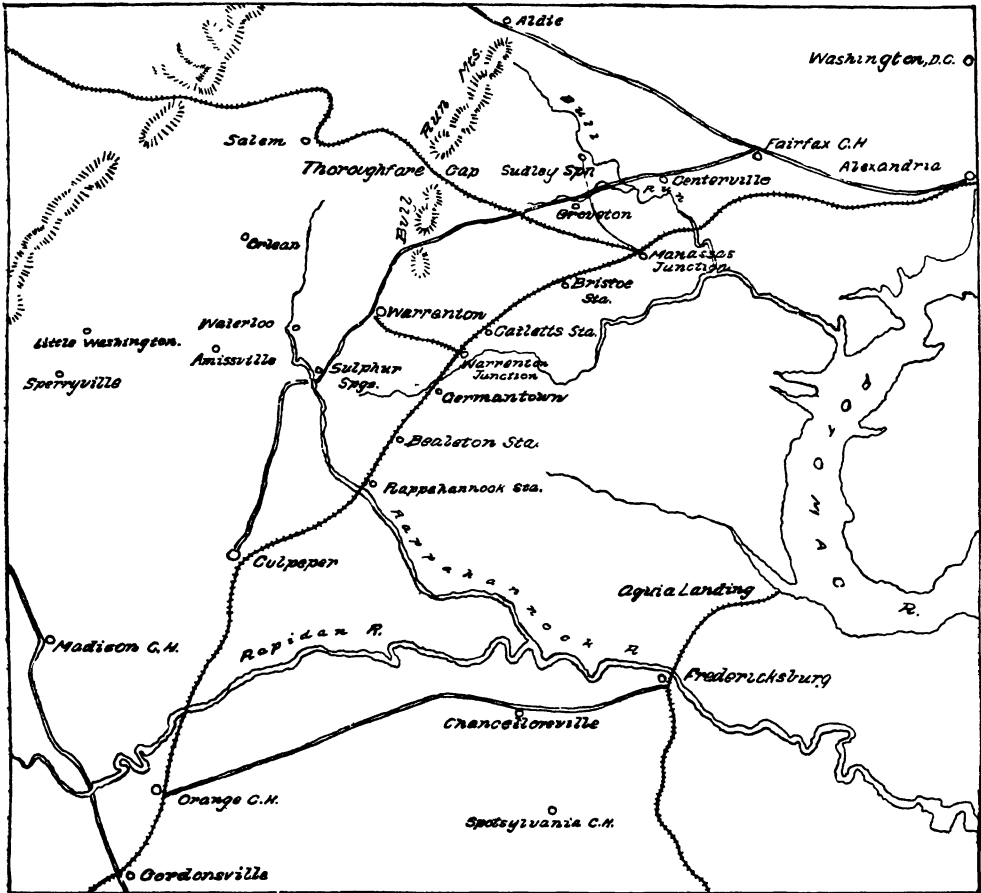
BULL RUN

advance of Heintzelman's corps arrived from the Army of the Potomac, Hooker's and Kearny's divisions, and Fitz-John Porter, with the divisions of Sykes and Morell of his corps. These two corps with Reynolds' Division were the only re-inforcements that Pope received from the Army of the Potomac until after the battle of Manassas.

On the night of the 27th Pope, supposing Jackson at Manassas, ordered general concentration in that direction. Porter's failure to move promptly under this order constituted one

Jackson was just north of it on the first Bull Run field. The Union approach led Jackson to attack, thus revealing his position, which Pope had been vainly seeking. This was the battle of Gainesville, being a very bitter fight between Taliaferro's Division and two brigades of Ewell, and King of McDowell's advance.

After the close of the fight, in the absence of McDowell, his two divisions retreated, Rickett's to Bristoe Station, and King's to Manassas. At daylight of the 29th the Union forces were again put in motion to pursue Jackson. His line was



THEATRE OF SECOND BULL RUN CAMPAIGN

of the charges under which he was subsequently court-martialed and cashiered. Rickett's Division, the rear of McDowell's corps, upon the information from the cavalry that Longstreet's forces were entering Thoroughfare Gap, moved to the gap and held Longstreet back during the day, and into the evening of the 28th. In the afternoon of the 28th Pope, supposing Jackson east of Bull Run, ordered his army to Centerville, Heintzelman and Reno by the fords of Bull Run, McDowell, Sigel, and Reynolds by the Warrenton turnpike. The advance along the turnpike was begun without the knowledge that

mainly along an unfinished railroad, the left near Sudley Spring, and his right on high ground north of the Warrenton road overlooking Groveton. The Union forces attacked throughout the day, with brief intermissions. The contest was desperate, and Jackson's line, though hard pressed at various points, maintained its organization. Porter's failure to here attack the Confederate right was another of the charges under which he was tried. Subsequently, however, he was exonerated by the findings of an army board, and restored to his rank by act of Congress. McDowell arrived late, with King's Division.

BULL-SNAKE — BULLA

As it moved into action it encountered the head of Longstreet's column, which had achieved its junction with Jackson. In less than an hour, in a bloody contest, Hood's Division of Longstreet's force had ended the battle of Groveton. Such were the preliminaries of the Second Bull Run.

The battle of Manassas, the Second Bull Run, was fought 30 August, the day following the action at Groveton. The movement covered the ground of McDowell's and Johnston's battle of the year before. Jackson's line occupied the position from Sudley Spring to the heights overlooking Groveton. Lee, whose forces were now all up, formed Longstreet's line across the Warrenton turnpike on high ground about a mile west of Groveton. On this ridge he established a number of batteries under Stephen D. Lee and Walton. The line then turned east south of the turnpike, and extended toward the Sudley Spring road. The Confederate position south of the Warrenton road seemed not to be suspected by Pope. The fact that after the action of the afternoon before Jackson's troops had retired to their morning position Lee had withdrawn Longstreet's advance to form on better ground, misled Pope and caused him to insist that the enemy was retreating. At noon, after reconnaissances north of the road, he therefore ordered vigorous pursuit. Porter was to push west on the Warrenton pike followed by King's Division on his right and Reynolds' on his left. Ricketts' Division, followed by Heintzelman's corps, was to pursue on the Haymarket road. Sigel's and Reno's corps were the reserves.

About four o'clock Porter advanced with his own corps and King's Division pushed in on Jackson's line with great vigor, and assault followed assault, each made with great pertinacity. Lee seemed willing to let them continue in order to exhaust his opponents. At length Jackson sent for help, and Longstreet was ordered to his assistance. This officer had, however, posted his batteries so as to enfilade Jackson's front, and instead of sending troops, opened with a terrific flanking fire of artillery. The Union lines were repulsed with great loss. Nearly all of Pope's forces had been put in north of the turnpike and had been seriously repulsed. All Union support was now directed to defend the position against Longstreet's forces south of the Warrenton pike. The whole of Longstreet's line went forward toward the road with a rush. There were five divisions — Wilcox on the left, then Evans (Hood), Anderson, Kemper, and Jones. As soon as Jackson, north of the road, saw the advance of Longstreet he ordered his own line forward. The corps of Heintzelman and Reno resisted this attack, but were gradually forced back. The supreme struggle of the Union forces was to hold two elevated positions near the Henry and Chinn houses. The latter, known as Bald Hill, was carried by the Confederates, after persistent and sanguinary fighting. The Henry house hill was held against repeated assaults. The Union army was in retreat across Bull Run, and the possession of the hill was necessary to maintain an orderly retreat.

The Union troops remained in possession until eight o'clock, when the last of Pope's army moved unmolested toward the Stone Bridge, crossing Bull Run about midnight. The bridge was then destroyed and the Union army concentrated at Centreville. It was a Union defeat,

but not a rout. While there was much straggling, the main army had retreated in good order, and Lee did not pursue. In the management of the battle Lee had displayed his eminent generalship in a striking manner. Pope's chief error had been in persisting, before his attack was delivered, that the enemy was in retreat.

Pope was re-inforced at Centreville by the strong corps of Sumner and Franklin from the Army of the Potomac. Here also he found supplies. His army had fought for two days almost entirely without food or forage. Lee began pursuit the afternoon of the day after the battle, Jackson leading from Sudley Ford, and marching by a circuitous route toward Fairfax Court House, seven miles in rear of Centreville. Passing Chantilly, he turned toward the Warrenton turnpike and formed in front of Ox Hill, his right extending toward the pike. He was far in advance of Longstreet, and wholly without support. He was attacked by the two divisions of Reno under Stevens, and later by Kearny. Stevens and Kearny were killed, and Jackson was repulsed.

Longstreet came up at night, and at noon the next day (2 September) Pope's army was ordered by the authorities at Washington to withdraw within the defenses of the city. Pope's losses throughout the campaign from 16 August to 2 September were: Army of Virginia, killed and wounded 5,318, missing 2,787; Army of the Potomac, killed and wounded 3,613, missing 1,115; 9th Army Corps, killed and wounded 1,204, missing 319; Kanawha division, killed and wounded 64, missing 42; total killed and wounded 10,199; captured or missing 4,263. The Confederate losses are not fully reported, but the best estimates placed them at about 8,500. There are no official returns which enable a presentation of the exact strength of either army during the campaign up to 30 August, but the best estimate places the Union forces at about 65,000 to 70,000, and the Confederate at 54,000.

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Bull-snake. See PINE SNAKE.

Bull-terrier. See TERRIER.

Bull-trout. (1) A salmon-like trout of North America. See SALMON-TROUT. (2) The Dolly Varden trout (q.v.).

Bulla, a genus of mollusks called, from the thinness of their shells, bubble-shells. The shell is oval, ventricose, convoluted externally, or only partially invested by the animal. The animal has a large cephalic disk bilobed behind; the lateral lobe is much developed. It occurs in

temperate and tropical seas from 25 to 30 fathoms. Over 50 recent species are known and 70 fossil, the latter from the Oölite onward.

Bullace, a small tree or shrub allied to the prunes. It is akin to the variety *Spinosa* (the sloe), but differs in having the peduncles and under side of the leaves pubescent and the branches slightly spinous, whereas the *Spinosa* has the peduncles glabrous, the leaves ultimately so also, and the branches decidedly spinous. It stands midway between the plum and the sloe. In England its fruit is used for making jam. The tree is seldom found in America.

Bullæ, miniature blisters, or blebs. They are larger than vesicles, with a large portion of cuticle detached from the skin and a watery transparent fluid between. The skin beneath is red and inflamed.

Bullant, Jean, zhôn bù-làn, French architect: b. probably in Ecouen about 1515; d. Paris, 10 Oct. 1578. He studied at Rome and after his return to France became supervisor of the royal buildings. He was connected with the erection of the Tuileries and built the pavilion named for him. He was also the architect of the Hôtel de Soissons for Catherine de Medici. In 1570 he succeeded Primaticcio at Fontainebleau.

Bullbat, a name in the Southern States for the nighthawk (q.v.), a bird which flies in the dusk like a bat, and makes a booming sound.

Bulle, bul-lê, **Konstantin**, German historian: b. Minden, 30 March 1844. He studied philosophy and history at Jena and Bonn, taught in the high school at Bonn and became director of the gymnasium there in 1879. In 1887-90 he was a member of the Reichstag. After some philosophical studies he devoted himself to historical work and wrote: 'History of Recent Times 1815-71'; 'History of the Years 1871-7' and 'History of the Second Empire and the Italian Kingdom.' The first two were combined and published as 'History of Recent Times' in 1886.

Bullen, bul'lên, **Frank Thomas**, English author and lecturer: b. Paddington, London, 5 April 1857. He received but scanty schooling, and after a few years' experience as errand boy, etc., went to sea as ordinary seaman in 1869, becoming chief mate after several years. He left the sea in 1883 and was junior clerk in the English meteorological office, 1883-99. His contributions to nautical literature have attracted widespread attention. The earliest of these, 'The Cruise of the Cachelot' (1898) being the most noted. His other books include: 'Idylls of the Sea'; 'The Log of a Sea Waif' (1899); 'The Men of the Merchant Service'; 'With Christ at Sea'; 'A Sack of Shakings' (1901); 'The Apostles of the Southeast'; 'Deep Sea Plunderings' (1901); 'A Whaleman's Wife' (1902).

Buller, bul'lêr, **Sir Redvers Henry**, English general: b. Devonshire, 1839. He joined the 60th Rifles as ensign in 1858; in 1862 was promoted to the rank of lieutenant, and eight years later to that of captain. He was a major in 1874, lieutenant-colonel in 1878, colonel in 1879, and major-general in 1884. He served with his regiment in the Chinese campaign of 1860, and on the Red River expedition in 1870. During the Ashantee war he acted as quartermaster-

general and head of the intelligence department, and gained special mention for his behavior in several engagements. He also served with distinction during the Kaffir war of 1878, and the Victoria Cross was conferred on him in 1879 for his gallant conduct in saving the lives of two officers and a trooper of the Frontier Light Horse during the retreat at Inhloane in the Zulu campaign. He was chief of the staff to Sir Evelyn Wood in the war against the Boers in 1881, and in Egypt in the following year, gaining special distinction for his services at Kassassin, Tel-el-Kebir, and elsewhere. In the Sudan campaign of 1884-5 he was chief of the staff to Lord Wolseley, and was in command at the battle of Abu-klea when Sir Herbert Stewart had been wounded. From 1887 till 1890 he held the post of quartermaster-general of the army, and from 1890 till 1897 he acted as adjutant-general to the forces. In 1886-7 he was under-secretary to the lord-lieutenant of Ireland, and in 1891 was promoted to the rank of lieutenant-general. He was created K.C.M.G. in 1882, K.C.B. in 1885, and G.C.B. in 1894. In 1899 he went to Natal as commander in the war with the Boer republics, and succeeded in relieving Ladysmith after it had been besieged 118 days. His various reverses prior to this event caused him to be superseded by Gen. Roberts, and on his return to England he was placed on the retired list in consequence of an unwise speech of his. The publication of official documents, still later, practically destroyed his reputation as a commander, it being shown by these he had advised Gen. White, the defender of Ladysmith, to give up the defense and surrender to the Boers.

Bullers of Buchan, a large oval cavity in the rocks on the east coast of Aberdeenshire, about six miles to the south of Peterhead, forming a sort of pot or caldron about 150 feet deep, open to the sky above and communicating with the sea below by a natural arch or horizontal passage, into which the waves often rush with a tremendous noise.

Bullet, the projectile used for small-arms, either spherical or of an elongated form. The elongated bullet is now in general use for rifles, and there has also been introduced some means of dilating the bullet at the moment of explosion, so that it is forced into the grooves of the rifle and exactly fits the barrel. In some cases there is merely a cavity left at the base of the bullet into which the gases formed on the explosion of the gunpowder are forced, so that these have the effect of dilating the bullet in the manner required. In other cases a plug is inserted in the cavity, which is driven forward by the explosion of the gunpowder, and has the same effect. Spherical bullets remained in use long after the invention of the rifle, though several kinds of elongated bullets were suggested by various inventors of the 17th and 18th centuries. In 1837 the French adopted an elongated bullet invented by Delvigne, but this was superseded by the Minié bullet about 1846. A similar form, but with a wooden plug instead of an iron cup to cause the expansion, was introduced into the English army with the Enfield rifles of 1855. Previous to this, in 1841, the Prussians had adopted the celebrated needle breech-loading rifle, with an egg-shaped bullet resting on a thick wad which alone took the

BULLET-TREE — BULLINGER

grooves of the rifle. In 1864 the three-grooved Enfield barrel was combined with the Snider breech-action in the rifles of the English army. The bullet supplied with this arm had a plug of baked clay and a hollow head, the lubrication being effected by bees'-wax placed in four cannelures running round its base. In 1866 the Chassepôt rifle was adopted by the French authorities, the bullet having shoulders serving the same end as the wad in the needle-gun bullet. The temporarily introduced Snider-Enfield rifles were replaced in 1874 by the much better Martini-Henry type, whose bullet, though longer and of smaller diameter, has the cylindrical form with domed end found in the French Chassepôt. The lubrication in this case was effected by a covering of wax-paper and a bees'-wax wad. The diminution in the diameter of the bullet was carried still further in the Enfield-Martini rifle of 1886, the bullets then supplied measuring only about two fifths of an inch in diameter; and in several subsequent types of rifle they are of still smaller diameter. This decrease in calibre has been accompanied by an increase in length in order to preserve the weight of the bullet, and it has also been found necessary to cover the lead of the bullet with a thin coating of some such metal as steel, copper, nickel, or German silver. These changes are all embodied in the bullets of the Lee-Netford magazine rifle, and the necessity for lubricators is thus done away with. The Lee-Netford bullet has a length of 3.05 inches, and the diameter of .312 inch. There is considerable variation in the weight of bullets. The old Brunswick bullets weighed 557, the Minié, 680 grains. The Enfield bullet had a weight of 535 grains; the Snider and Martini-Henry, 480; the Enfield-Martini, 384, while the Lee-Netford bullet weighs only 216 grains. The French Lebel magazine rifle has a bullet with a weight of 215 grains, and in a later French form, the Berthier, the weight is 205 grains. The Lebel bullet is flattened at the point in order to lessen the risk of explosion in the magazine. The German Mauser and Mannlicher magazine rifles have bullets of the same weight as the Lee-Netford. The slenderness of modern rifle bullets has necessitated the construction of rifles of very small bore, and this in turn has compelled the substitution of pellets of compressed powder for the older loose powder. In recent years a peculiar kind of bullet known as the Dum-Dum has been employed by English troops in warfare with uncivilized races, as the frontier tribes of India. In this the lead core is inserted from the top, not from the base, as in other bullets, and the lead being unprotected at the point, has to sustain the shock of the impact. The consequence is that it expands in the wound, and thus, even though it should pass right through a person's body, its effects are very severe, and likely to stop the onrush of the foe.

Bullet-tree, or Bully-tree (*Mimusops Balata* or *Sapota Mulleri*), a forest tree of Guiana and neighboring regions, order *Sapotacea*, yielding an excellent gum known as balata, having properties giving it in some respects an intermediate position between gutta-percha and india-rubber, and making it for certain industrial purposes more useful than either. The timber of the tree also is valuable.

Bullfinch, an European finch (*Pyrrhula europaea*), frequently kept as a cage bird, mainly because of its ability to learn to whistle tunes, the most capable birds, trained in Germany, acquiring as many as six. The training of "piping bullfinches" is a special art, and various domestic varieties are bred, some of which bring high prices. Its natural song is not remarkable. The bullfinch is a large bird of its kind, with a big inflated beak, and soft dense plumage. It is pearl-gray above and dull red on the under parts; the crown of the head, the beak, and the tail and wing quills are black, the latter crossed by a broad white bar. The colors of the female are duller than those of the male. Several similar species are known elsewhere, one (*P. casini*) inhabiting Alaska. See **CAGE BIRDS**.

Bullheads. These small catfish, or "horned-pouts," are abundant everywhere east of the plains, and, by introduction, in California and Oregon. They are mud-loving fishes, remaining on the bottom and feeling for food with the barbels, one on each side of the mouth and two under the chin. The "common bullhead" (*Ameiurus nebulosus*) varies in length, at full age, from 18 to 24 inches, and occasionally weighs 5 pounds. It is brownish-black in color, with a fine, scaleless, rubber-like skin, a big head, and a long upper jaw. It is a gluttonous biter, gorging the bait, so that the hook must often be cut out of its interior. A smaller species, the black bullhead (*A. melas*) may be distinguished by the smaller anal fin and its nearly white rays. The southern "flat-headed cat" (*A. platycephalus*) has an eel-like form and a greenish brown hue, and is almost entirely herbivorous. Several of the large "catfish" (q.v.) of the western lakes belong to this genus.

Bulliard, Pierre, pē-ār bül-yär, French botanist: b. Aubepierre en Barrois, about 1742; d. Paris 1793. He was educated at the College of Langres, where he showed a decided taste for natural history, proceeded to Paris to pursue his medical studies, and employed his leisure in collecting the materials of a 'Flora Parisiensis,' which he afterward published in six volumes, with colored plates. Among his other works are a 'Herbier de la France,' and a 'Dictionnaire Élémentaire de Botanique,' which has been repeatedly printed.

Bullinger, Heinrich, hīn'rīn bül'ling-ēr, Swiss reformer: b. Bremgarten, 18 Aug. 1504; d. Zürich, 17 Sept. 1575. He studied first at Emmerich, in the duchy of Cleves, and afterward at Cologne. His intention was to become a Carthusian monk, but after perusing the writings of Melancthon and other reformers he changed his views, formed a close connection with Zuinglius, became one of the most strenuous supporters of his views, and ultimately succeeded him in his charge of Zürich. He was one of the authors of the first Helvetic Confession, drew up in concert with Calvin the formulary of 1549, by which the differences between the churches of Zürich and Geneva on the subject of the Lord's Supper were happily terminated, and kept up a close correspondence with the lately published by the Parker Society, con-principal English reformers. The Zürich Letters, tains part of this correspondence, and among others, letters addressed to him by Lady Jane Grey. The most important of his many writ-

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ings is a 'History of the Reformation.' See lives by Hess (1828-9); Vestalozzi (1858); also Heinrich, 'Bullinger und seine Gattin' (1875); Zimmermann, 'Die Züricher Kirche und ihre Antistes' (1877).

Bullion, *bül-yón*, uncoined gold or silver, in bars, plate, or other masses. United States standard bullion contains 900 parts of pure gold or pure silver, and 100 parts of copper alloy. The coining value of an ounce of pure gold is \$20.67183, and the coining value of an ounce of standard gold is \$18.60465. The coining value in standard silver dollars of an ounce of pure silver is \$1.2029, and the coining value of an ounce of standard silver is \$1.1636. The word bullion was of frequent use in the proceedings respecting the Bank of England from 1797, when the order of council was issued that the bank should discontinue the redemption of its notes by the payment of specie to 1823, when specie payments were resumed; for, by a previous law, the bank was authorized to pay its notes in uncoined silver or gold, according to its weight and fineness. The investigations of the bullion committees, and the various speculations on the subject of bullion, related to the supply of gold and silver, whether coined or not, as the basis of the circulating medium. The discovery of the mines in America did not at first add materially to the stock of bullion in Europe. The total addition for the first 54 years was about \$85,000,000; not quite so great an amount of value (in gold at least) as Russia has obtained from the Ural mines in less than half the time. The average annual supply from all the American sources during the 54 years from 1546 to the end of the 16th century, was rather more than \$10,000,000. During the 17th century the annual average was about \$16,250,000; in the next half century it was \$27,500,000; and in the years 1750 to 1803 it was \$38,000,000.

Bul'lock, Alexander Hamilton, American politician: b. Royalston, Mass., 1816; d. 1882. He was educated at Amherst College and the Harvard Law School and was admitted to the bar in 1841. After practising law in Worcester, Mass., he was elected to the Massachusetts House of Representatives in 1845 and re-elected in 1861, when he became speaker. In 1849 he became a member of the State Senate. He held many judicial offices, was mayor of Worcester in 1859, and from 1866-8 was governor of his State.

Bullock, Charles, English clergyman, editor and author: b. 24 Feb. 1829. He entered the Anglican ministry in 1855, was curate of Ripley, Yorkshire, 1857-9; of Luton, Bedfordshire, 1859-60; rector of St. Nicholas', Worcester, 1860-74. He has edited 'The Fireside Magazine,' 'Home Words,' and other periodicals, and among his published works are 'The Way Home'; 'The Royal Year'; 'England's Royal Home'; 'Shakespeare's Debt to the Bible'; 'Popular Recreation'; 'The Poet of Home Life'; 'Biography of Frances Ridley Havergal'; 'Crowned to Serve.'

Bullock, Charles Jesse, American economist: b. Boston, 21 May 1860. He graduated at the Boston University in 1889, devoted himself to special studies, and was appointed to the chair of economics in Williams College. He is the author of 'The Finances of the United

States, 1775-89' (1895); 'Introduction to the Study of Economics' (1900); 'Essays on the Monetary History of the United States' (1900); and has edited 'Currencies of the British Plantations in North America.'

Bullock, Rufus Brown, American politician: b. Bethlehem, Albany County, N. Y., 28 March 1834. He was educated at Albion Academy and early in life went to Georgia in connection with a business enterprise. During the Civil War he was connected with the quartermaster's department in the Confederate army. In 1867 he became a member of the State Constitutional Convention of Georgia and in the following year was elected governor. His championship of the negro members expelled from the legislature brought him such violent opposition that he resigned from office. He was actively engaged in the promotion of the railroad and industrial interests of his own State and was government director of the Union P. R.R.

Bullock, Shan F., Irish novelist: b. Crom, Fermanagh, Ireland, 17 May 1865. He has written a number of popular works. Among them are: 'The Awkward Squads' (1893); 'By Thrasna River' (1895); 'Ring o' Rushes' (1896); 'The Charmer' (1897); 'The Barrys' (1899); and 'Irish Pastorals' (1901). His work is remarkably individual and his studies of life in the north of Ireland are faithful reflections of Irish life and character.

Bullock, William A., American inventor: b. Greenville, Greene County, N. Y., 1813; d. Philadelphia, 14 April 1867. He learned the trade of machinist, and having started a periodical, 'The Banner of the Union,' he invented a printing-press in connection with that enterprise. He removed to New York and devoted himself to the construction and gradual development of a "planetary press," finally producing the Web perfecting press that delivers 30,000 papers per hour, printed, cut and folded. While handling one of his presses he met with an injury that proved fatal.

Bulls and Bears, a popular phrase used in connection with the stock market. The term "bulls" is applied to the operators attempting to force up prices, and the term "bears" to those seeking to lower them.

Bull's Horn Coraline (so named because the shape of the cells is like a bull's horn), a zoophyte of the family *Cellariadae*. It is the *Eucratia loricata*. It is branched subalternate, and has the cells conical, with a raised orifice, beneath which is a spinous process.

Bulnes, Manuel, *mā-noo-el'* bool-nās, Chilean soldier and statesman: b. Concepcion, 25 Dec. 1799; d. Santiago, 18 Oct. 1866. He served in most of the battles of the Chilean revolution. In 1838 he commanded the Chilean army of 5,000 men against Santa Cruz, in Peru, and was finally instrumental in driving Santa Cruz from the country and breaking up the Peru-Bolivian confederation. In 1841 he was elected president of Chile and served for four years. He was afterward senator and councillor of state.

Bülow, Bernhard, *börn'härt bü'lō*, **Count von**, German statesman: b. Klein-Flottbeck, Holstein, in the spring of 1849. He came of a

BULOW — BULRUSH

distinguished family, and was, on the mother's side, of Danish ancestry. He was educated at Lausanne, Leipsic and Berlin, studied law and served in the Franco-German war, where he rose to the grade of lieutenant. After filling the posts of secretary of legation at Rome, St. Petersburg, and Vienna, he became chargé d'affaires at Athens during the Russo-Turkish war, and later was secretary of the Berlin Congress. In 1888 he was appointed minister to Rumania, and in 1893 ambassador to Italy. He was called home to become minister of foreign affairs. His skilful treatment of the Samoan difficulty won him popular favor in his own country. During the Chinese complications in 1900 he fully supported the emperor's foreign policy. When Prince Hohenlohe resigned, 16 Oct. 1900, Von Bülow was called to succeed him as chancellor of the empire.

Bülow, Bertha von, bār'ta fōn, German story writer: b. Warmbrunn, Silesia, 30 Sept. 1850. Among her stories which enjoy great popularity are 'Merry Tales' (1891); and 'Once in May and Other Stories' (1892). She has also written some good comedies, namely, 'Theory and Practice' (1890), and 'Two Peaceful Ones' (1892).

Bülow, Friedrich Wilhelm, fräd-rīh vīl'-helm (COUNT VON DENNEWITZ), Prussian general: b. Falkenberg, 16 Feb. 1755; d. Königsberg, 25 Feb. 1816. In his 14th year he entered the Prussian army. In the war of 1806 he was a lieutenant-colonel at the siege of Thorn, and distinguished himself in various battles. In 1808 he was made major-general and general of brigade. When the war against France broke out in 1813 he fought the first successful battle at Mockern, 5 April; 2 May took Halle, and protected Berlin from the danger which threatened it, by his victory at Luckau 4 June. He saved Berlin a second time by the memorable victory of Grosbeeren, 23 August, and relieved the same city a third time by the great victory at Dennewitz. For this service the king made him one of the few grand knights of the Iron Cross, and after the end of the campaign bestowed on him the title Count Bulow of Dennewitz, and made the same hereditary in his family. At the storming of Leipsic, 19 October, he took an important part. At the opening of the campaign of 1815 he received the chief command of the fourth division of the army, with which he contributed so essentially to the victory of Waterloo, that the king gave him the command of the 15th regiment of the line, which was to bear in future the name of the Regiment of Bülow von Dennewitz.

Bülow, Hans Guido von, hänts gwē'dō fōn, German pianist and composer: b. Dresden, 8 Jan. 1830; d. Cairo, Egypt, 12 Feb. 1894. He studied the piano under Liszt, and made his first public appearance in 1852. In 1855 he became leading professor in the Conservatory at Berlin; in 1858 was appointed court pianist; and in 1867 he became musical director to the king of Bavaria. His compositions include overture and music to 'Julius Caesar,' 'The Minstrel's Curse,' and 'Nirvana'; songs, choruses, and pianoforte pieces. He was considered one of the first of pianists and orchestral conductors. In 1875-6 he gave a series of concerts in the principal cities of the United States. His Letters appeared 1895-7.

Bülow, Heinrich (hīn'rīn) von, German military writer: b. Falkenberg, in Altmark, about 1757; d. Riga, Russia, 1807. He studied in the military academy at Berlin, and afterward entered the Prussian service. But he soon retired, and occupied himself with the study of Polybius, Tacitus, and J. J. Rousseau, and then served for a short period in the Netherlands. He afterward undertook to establish a theatre, but immediately abandoned his project, and visited the United States, whence he returned poor in purse but rich in experience, and became an author. His first work was on the 'Art of War,' in which he displayed uncommon talents. He wrote a book on 'Money,' translated the 'Travels of Mungo Park,' and published in 1801, his 'History of the Campaign of 1800.' In 1804 he wrote 'Lehrsatze des neuern Krieges' (Theory of Modern Warfare) and several other military works, among which is his 'Tactics of the Moderns as They Should Be.' In the former he points out the distinction between strategy and tactics, and makes the triangle the basis of all military operations. This principle of his was opposed by Jomini, and other French writers. His history of the war of 1805 occasioned his imprisonment in Prussia, at the request of the Russian and Austrian courts. He died in the prison of Riga. He was a follower of Swedenborg.

Bülow, Karl Eduard von, kärl ēd-wārd fōn, German author: b. Berg vor Eilenburg, Saxony, 17 Nov. 1803; d. Ötztshausen, 16 Sept. 1853. His literary fame rests mainly on his 'Book of Tales,' after ancient Italian, Spanish, French, English, Latin, and German originals (4 vols. 1834-6), which was followed by a supplementary volume. Of his own original compositions, the 'Springtide Wandering Among the Hartz Mountains' is one of the best. He wrote also the very interesting story of 'The Youth of a Poor Man of Toggenburg,' founded on the autobiography of Ulrich Bräker, a Swiss weaver. He published the original later.

Bülow, Margarete von, mar-ga-rā'ta fōn, German novelist: b. Berlin 1860; d. near there, 2 Jan. 1885. She wrote four volumes of stories, namely, 'Stories' (1885); 'Jonas Briccius' (1886); 'Chronicle of the Riffelshausen Folks' (1887); 'New Stories' (1890). She delineated character with great precision, and displayed true insight into the human heart. She lost her life in an attempt to rescue a boy from drowning.

Buloz, François, frān-swā bū-lō, French publicist: b. Bulbenn, Savoy, 20 Sept. 1803; d. Paris, 12 Jan. 1877. In 1831 he became editor of the 'Revue des Deux Mondes,' the celebrated French fortnightly literary magazine. From 1835-45 he also edited the 'Revue de Paris.' For 10 years (1838-48) he was director of the Comédie Française.

Bulrampur, bool-rūm-poor', a town of India, in the Fyzabad division of Oudh, the residence of the Maharaja of Bulrampur. It has a trade in rice, etc., besides manufactures of cotton and other articles. Pop. (1891) 14,849.

Bulrush, a popular name for tall, reed-like plants which grow in marshy places, and which for the most part belong to the genus *Scirpus*. The common bulrush is frequent in clear waters and about the borders of rivers throughout Europe, as well as in North America and New

BULTHAUPT — BULWER-LYTTON

South Wales. The roots are thick and stout, creeping under water in the deep mud; the stems are of a dark-green color, and four or five feet or more in height, and are naked, smooth, round, tough, pliant, and spongy within. Their base is covered with several sheathing scales, partly ending in leafy points. They are useful for packing and thatching, and especially for plaiting into the bottom of chairs.

Bulthaupt, Heinrich Alfred, hīn'rih al-frēd boolt'haupt, German poet and dramatist: b. Bremen, 26 Oct. 1849. On quitting the university he was for a while a private tutor; then traveled in the East, Greece, and in Italy. He was a lawyer in his native town for some years, and in 1879 became custodian of the city library. Of his dramatic compositions the list is very long, comprising tragedies, 'Saul'; 'A Corsican Tragedy'; plays dealing with the questions of the time, 'The Workman'; comedies, comic operas, etc. He has also written 'Dramaturgy of the Theater'; 'Dramaturgie der Klassiker,' a work of exceeding value; and 'Dramaturgie des Schauspiels'; also 'Dramaturgy of the Opera' (2 vols.).

Bulti, bool'tē, **Bultistan**, or **Little Thibet**, a former state of central Asia, tributary to the rulers of Cashmere, in the northwestern part of the mountainous curve of the Himalayas, forming the northeastern boundary of Hindustan. It is on the north slope of the chain, and in the valley of the Indus. It is a table-land, 6,000 feet above sea-level, and the surrounding peaks rise 7,000 feet higher. The climate is therefore cold, though European fruits abound. The inhabitants are Tartars, and their religion, Mohammedan. The land was subdued by Gholab Singh in 1846. Until then it was an independent state, the last independent ruler having been Ahmed Shah. The area is estimated at about 12,000 square miles. The capital is Iskardo.

Buluwayo. See BULAWAYO.

Bulwark, a rampart, defense, or shield. In nautical usage, bulwarks are the continuation of a ship's side above the upper deck, and form a protection against waves. The term is often used metaphorically; as, the Constitution is the bulwark of American liberties.

Bulwer, John, English physician. He flourished in the 17th century and appears to be entitled to the honor of having first pointed out a method of instructing the deaf and dumb. The work in which his method is explained is entitled, 'Philocophus, or the Deafe and Dumb Man's Friend, exhibiting the Philosophical Verity of that subtle Art which may enable one with an observant Eie to heare what any Man speakes by the moving of his Lips.' This work was published in 1648, whereas Willis, to whom the invention has generally been attributed, published nothing on the subject till 1670. In connection with the same subject Bulwer published a 'Chironomia, or the Art of Manual Rhetoric'; and a 'Chirologia, or the Natural Language of the Hand.' A still more curious work is entitled 'Anthropometamorphosis,' in which he shows the astonishing variety of forms and garbs exhibited by man in the different ages, and among the different nations.

Bulwer, William Henry Lytton Earle (BARON DALLING AND BULWER), English author

and diplomatist, brother of Sir Edward Bulwer-Lytton (q.v.): b. London, 13 Feb. 1801; d. Naples, 23 May 1872. He was minister to Madrid in 1843; in 1849 had a diplomatic mission to Washington, and was one of the negotiators of the Bulwer-Clayton Treaty (q.v.); was ambassador to Turkey in 1858-65. He was created Baron Dalling and Bulwer in 1871. His works include 'An Autumn in Greece' (1826); 'France, Social, Literary, and Political' (1834-6); 'Life of Byron' (1835); 'Historical Characters' (1868-70); 'Life of Palmerston' (1870-4).

Bulwer-Clayton Treaty, a treaty negotiated at Washington, D. C., in April 1850, by John M. Clayton, secretary of state under President Taylor, and Sir Henry Bulwer, British minister to the United States. It provided that neither the United States nor Great Britain should attempt to control a proposed canal across Nicaragua. The treaty provided further for the neutrality of the canal, and it guaranteed encouragement to all lines of interoceanic communication. The terms of the treaty were afterward much disputed. In 1882 the United States government intimated to Great Britain that the canal having become impracticable because of reasons for which Great Britain alone was responsible, the United States considered the treaty as no longer binding, but Great Britain continued to hold it as in force. On 3 March 1899, Congress passed a bill providing for the construction of a canal on the Nicaragua route, which also authorized the President to open negotiations with Great Britain for the abrogation of the Bulwer-Clayton Treaty, and under the last clause a convention between the two countries, abrogating the portions of the treaty that were deemed to be against the interests of the United States was signed in Washington, 5 Feb. 1900.

Bulwer-Lytton, Edward George Earle (1st LORD LYTTON), English novelist, playwright, and poet: b. London, 25 May 1803; d. Torquay, Devonshire, 18 Jan. 1873. He was the youngest son of Gen. Earle Bulwer and Elizabeth Barbara Lytton, heiress of Knebworth, to whose estates he succeeded in 1844 and assumed the surname of Lytton. In 1847, and again in 1852 he sat in Parliament; and in 1858-9 was colonial secretary, during which he called into existence the colonies of British Columbia and Queensland. In 1866 he was raised to the peerage as Baron Lytton. Altogether his works exceed 60 in number, and fill 110 volumes. His novels display great versatility, range of power, power of handling psychological and social problems, variety of incident and portraiture; and many are based on romantic and occult themes. Among the most famous are 'Falkland' (1827); 'Pelham' (1828); 'Devereux' (1829); 'Paul Clifford' (1830); 'Eugene Aram' (1832); 'Godolphin' (1833); 'Pilgrims of the Rhine' (1834); 'Last Days of Pompeii' (1834); 'Rienzi' (1837); 'Ernest Maltravers' (1837); 'Alice, or the Mysteries' (1838); 'Last of the Barons' (1843); 'Harold' (1843); 'The Caxtons' (1850); 'My Novel' (1853); 'What Will He Do with It?' (1859); 'A Strange Story' (1862); 'The Coming Race' (1871); 'Kenelm Chillingly' (1873); and 'The Parisians' (1873). Three of his dramas—'The Lady of Lyons' (1838); 'Richelieu'

(1838); and 'Money' (1848) — still hold the stage. Consult lives by Cooper (1873); ten Brink (1882); and 'Life, Letters, and Literary Remains of Edward Bulwer, by His Son' (1883).

Bulwer-Lytton, Edward Robert. See LYTTON, EDWARD ROBERT BULWER.

Bum-boat (perhaps originally "boom-boat," from the boom rigged out from the side of a man-of-war at anchor, to which boats may make fast), employed by hucksters to visit ships lying at anchor, with supplies of provisions, trinkets, clothing, etc., for sale to the sailors.

Bum'ble, the consequential beadle in Dickens' 'Oliver Twist.'

Bumblebee, a wild bee of some species of the genus *Bombus*, of which upward of 50 species inhabit North America. Few occur in the southern hemisphere or tropical regions, and none in Africa south of the Sahara or in Australia, while they are the only bees inhabiting Arctic and Alpine regions. The bumble, or humble, bee is recognized by its large, thick, hairy body and long bass hum. The colonies of bumblebees are not numerous compared with those of wasps, or the stingless or the honey bee. A populous colony in England and America may number from 300 to 400 individuals. The proportion of sexes and castes of *Bombus muscorum* in England were found by Smith to be, in a colony of 120, 25 females, 36 males, and 59 workers. The roundish oval cells differ in size and have no exact arrangement. Besides the cells containing the young, the old discarded ones are made to serve as honey tubs or pollen tubs, and there are also the cells of the guest or Psithyrus bees (q.v.). In good weather and when flowers are plentiful the bees collect and store honey in abundance, and when the empty pupa-cells are full they form special cells made entirely of wax and these are filled with honey, and left open for the benefit of the community (Sharp). Hofer states that special tubs for the storing of pollen are sometimes constructed. Putnam says that the larvæ make their own cells of silk, which are finally strengthened with wax by the old bees. Bumblebees have been seen working in warm moonlight nights. About two centuries ago Godart stated that a trumpeter bee is kept in some nests to rouse the colony to work by three or four o'clock in the morning, and this has been recently confirmed by Hofer, who observed the fact in his laboratory. If the trumpeter was removed its place was filled the next morning.

There is a great deal of variation in our bumblebees, and, besides the local and climatic varieties, polymorphism is apparently marked, as Packard has (in *Bombus fervidus*) detected two sets of males and females, the large and the small; but whether there are two sizes of workers has not yet been ascertained.

The queen bees lay their eggs in masses of bee-bread attached to the top or sides of the old cells, in little enclosures formed by thin partitions set up by the bee after the eggs have been deposited. Thus placed, says Packard, in a mass of food, the young larvæ, on hatching, begin, by eating the food, gradually to construct their cells in the manner described by Putnam, who gives the following account of the economy of the bumblebee colony:

The queen awakens in early spring from her winter's sleep beneath the leaves or moss, or in deserted nests, and selects a nesting-place, generally in an abandoned nest of a field-mouse, or beneath a stump or sod, and immediately collects a small amount of pollen mixed with honey, and in this deposits from seven to fourteen eggs, gradually adding to the pollen mass until the first brood is hatched. She does not wait, however, for one brood to be hatched before laying the eggs of another; but, as soon as food enough has been collected, she lays the eggs for the second.

As soon as the larvæ are capable of motion, and commence feeding, they eat the pollen by which they are surrounded, and gradually separating, push their way in various directions. Eating as they move, and increasing in size quite rapidly, they soon make large cavities in the pollen mass. When they have attained their full size, they spin a silken wall about them, which is strengthened by the old bees covering it with a thin layer of wax, which soon becomes hard and tough, thus forming a cell. The larvæ now gradually attain the pupa stage, and remain inactive until their full development. They then cut their way out, and are ready to assume their duties as workers, small females, males, or queens.

It is apparent that the irregular disposition of the cells is due to their being constructed so peculiarly by the larvæ. After the first brood, composed of workers, has come forth, the queen bee devotes her time principally to her duties at home, the workers supplying the colony with honey and pollen. As the queen continues prolific, more workers are added, and the nest is rapidly enlarged. About the middle of summer eggs are deposited which produce both small females and males. All eggs laid after the last of July produce the large females or queens; and, the males being still in the nest, it is presumed that the queens are impregnated at this time, as, on the approach of cold weather, all except the queens, of which there are several in each nest, die.

Consult Putnam, 'Notes on the Habits of Some Species of Humblebees'; and Packard, 'The Humblebees of New England and Their Parasites' (Proceedings Essex Institute, IV.); Sharp, 'Insects,' Part II.

Bum'blefoot, a corn or abscess on the feet of domestic fowls, thought to arise from roosting on narrow perches or walking on sharp pebbles. The disease is sometimes incurable, but in other cases yields to the daily application of lunar caustic.

Bumblepuppy, a coined word used to describe the attempts of unskilful persons to play whist; opposed to scientific whist and "the rigor of the game."

Bummalo'ti, a fish (*Harpodon nehereus*), related to the salmon, but marine, which is caught in large quantities on the western coast of India, dried, salted, and exported all over the East. A trade-name is "Bombay duck."

Bump'ing Posts, constructions at the ends of railroad tracks in shifting yards, intended to prevent cars from running off the track. They are usually strong wooden frames with buffers placed at such a height as to receive the blow of the platform or coupler of the car. Banks of earth or cinders are sometimes utilized

for this purpose and portable metal posts known as shipblocks are frequently employed as bumping posts.

Bumpo, Natty. See LEATHERSTOCKING.

Bump'us, Herman Carey, American educator: b. Buckfield, Maine, 5 May 1862. He was graduated from Brown University in 1884, was professor of biology at Olivet College, Mich., 1886-9; professor of zoology in Clark University, Worcester, Mass., 1890-1; and professor of comparative anatomy in Brown University from 1892. In 1898 he was appointed director of the biological laboratory of the United States Fish Commission at Wood's Hole, Mass. He is the author of 'A Laboratory Course in Invertebrate Zoology' (1893).

Bunce, Francis Marvin, American naval officer: b. Hartford, Conn., 25 Dec. 1836; d. there, 19 Oct. 1901. He entered the naval service in 1851, and was graduated from the naval academy in 1857. In 1862 as executive officer of the *Penobscot* he took part in the engagement with the rebel batteries at Yorktown, Va. Assigned to temporary duty with the army, he had charge of the disembarkation of the heavy artillery and mortars for use in the investment of Yorktown by Gen. McClellan, April 1862. He commanded a successful expedition up Little River, between North and South Carolina, destroying several schooners and large quantities of cotton, turpentine, and resin, together with extensive salt works. With the monitor *Patapsco* in 1863 he took part in all the actions in which she was engaged during the siege of Charlestown, and was wounded by the premature explosion of a cartridge. Later he was chief of scouts on the staff of Admiral Dahlgren. On 5 Sept. 1865 he was placed in command of the monitor *Monadnock*, and took that vessel from Philadelphia to San Francisco, the first extended sea voyage ever made by a monitor. On 1 March 1895 he was selected to command the North Atlantic squadron, with the rank of active rear-admiral. On 1 May 1897 he went to the Brooklyn navy yard and there superintended the conversion of many fast ships and yachts for war service. It is said that the government's policy of furnishing the navy with abundant ammunition for target practice and giving prizes for the best shots, a policy which produced such admirable results in the Spanish-American war, was due to the efforts of Admiral Bunce. He was commissioned rear-admiral 6 Feb. 1898, and retired from active service 25 Dec. 1898.

Bunce, Oliver Bell, American author: b. New York, 8 Feb. 1828; d. there, 15 May 1890. After spending several years as clerk in a stationery store, and bookseller and publisher on his own account, he became manager of the publishing house of James G. Gregory, which he conducted very successfully for many years. It was at his instigation that the fine edition of Cooper's works, with steel and wood engravings by F. O. C. Darley, was planned and published. For a short time he was a reader for Harper & Bros., but in 1860 he formed a connection with D. Appleton & Company, that ended only with his death. He edited 'Appleton's Journal,' and largely planned and carried through for the firm some of their most famous illustrated publications, such as 'Picturesque America,' 'Picturesque Europe,' 'Picturesque

Palestine.' In addition to office business his literary aptitudes and ambitions kept him at work in spite of chronic invalidism. He wrote among other works, 'Romance of the Revolution' (1852); 'A Bachelor's Story' (1859); 'Life Before Him' (1860); 'Bachelor Bluff, His Opinions, etc.' (1881); 'Don't: A Manual of Mistakes and Improprieties' (1883), of which over 100,000 copies have been sold; 'My House: An Ideal' (1884), a graphic study of a country home; and 'The Adventures of Timias Terrystone: a Novel' (1885). As a very young man he wrote three plays which were accepted and produced on the stage with success: 'Fate, or the Prophecy,' a tragedy; 'Love in '76,' a comedy; 'Marco Bozzaris,' an heroic tragedy. The second of these was played by Laura Keane, the other two by James W. Wallack.

Bun'co, a familiar term applied to the practices of a certain class of swindlers. The trickster trades upon the credulity of an apparently well-to-do stranger in the city, under pretense of some connection with the latter's friends or native place, or by similar expedients. After confidence is secured, counterfeit money is imposed upon him, he is induced to cash "bogus" checks, etc., or even becomes the victim of more direct robbery.

Buncombe, swollen political oratory not directed to the point in hand or the audience present, but to the achievement of a charlatanic reputation outside. "Twisting the tail of the British lion," and other like feats of windy chauvinism, are specimens of buncombe; the object being, not primarily to impress the hearers, but to make the general populace admire one's swaggering patriotism. The reputed origin of the story is an anecdote of a member of the North Carolina legislature, from Buncombe County in that State, who told the thin remnants of a house he had nearly emptied by his dull and pointless remarks, that they might go, too, as he was only "speaking for Buncombe." Wheeler, 'History of North Carolina.'

Bundahish. See INDIAN LITERATURE.

Bundelcund, būn-dēl-kūnd', or **Bandal-khand,** būn-dēl-kānd', India, a tract, consisting partly of certain British districts connected with the Northwest Provinces, and partly of a number of small native states subordinate to the central India agency. Its surface is considerably diversified, and there are several ranges of hills, some of which reach the height of 2,000 feet. It has soil of every variety, which yields almost every grain and plant of India. Its waters are carried by different streams to the Jamna, and so to the Ganges. The total area is 20,559 square miles, of which the British districts occupy 10,332. Population of the latter (1901) about 1,400,000.

Bundesrath, boon'dēz-rāt, the German federal council which represents the individual states of the empire, as the Reichstag represents the German nation. It consists (1900) of 58 members, and its functions are mainly those of a confirming body, although it has the privilege of rejecting measures passed by the Reichstag.

Bundi, boon'de, India, a principality in Rajputana, under British protection; area, 2,300 square miles. Although small, Boondee is important as the medium of communication be-

BUNGALOW — BUNNING

tween the north and south. Pop. 295,675. Bundi, the capital, is picturesquely situated, and its antiquity, numerous temples, and magnificent fountains give it a very interesting appearance. Pop. 22,544.

Bun'galow, an East Indian term for a kind of country house with a thatched or tiled roof. Bungalows are generally of one story, though sometimes of two, and have verandas running round them to afford shelter from the sun. Public bungalows for travelers (daks) are maintained by government on the main highways.

Bun'gay, England, a market town in Suffolk, on the right bank of the Waveney, 30 miles northeast of Ipswich. It is well built; the streets, spacious and well paved, diverging from a moderate-sized area in the centre of the town, forming a market-place, in which is a handsome cross. It has two fine churches. The principal trade is in corn, coal, flour, lime, and malt, in which a considerable amount of business is done. There is also an extensive printing-office and stereotype foundry. Adjoining the town is a very spacious common. Pop. about 4,000.

Bunge, boon'gè, **Alexander**, Russian botanist: b. Kiev, 24 Sept. 1803; d. 1890. He was educated at Dorpat, and after taking the degree of M.D. in 1825 he traveled in Siberia and the eastern part of the Altai Mountains, and then joined the mission of the Academy of St. Petersburg to Peking, where he remained eight months and procured an extensive herbarium. In 1833, by invitation of the Academy of St. Petersburg, he made a second Asiatic journey, and in 1836 settled as professor of botany at Dorpat. His principal publications are catalogues of the plants which he collected in China and near the Altai Mountains.

Bunge, Frederic George, Russian jurist: b. Kiev (brother of the preceding), 1 March 1802; d. 1897. He was educated at Dorpat, and for many years was professor of law there. His writings, principally upon the history of law and rights in the countries around the Baltic Sea, are numerous and valuable.

Bungert, August, ow'goost boon'gärt, German composer: b. Mulheim, Prussia, 14 March 1846. He studied under Kufferath at Mülheim, at Cologne, and Paris. He held a position as musical director at Kreuznach, then went to Berlin, where he continued his studies under Kiel, and later moved to Genoa. His compositions include an opera cycle, 'The Homeric World,' consisting of two main parts, 'The Iliad,' and 'The Odyssey'; 'Tasso'; 'The Students of Salamanca,' a comic opera; 'On the Wartburg'; and a number of songs. The songs are considered his most successful productions.

Bu'nias, a small genus of plants of the natural order *Crucifera*, mostly natives of south-eastern Europe and adjacent Asia. Some of the species, especially *B. orientalis*, called hill-mustard, have been cultivated for forage, and have become weeds where they have escaped from cultivation. Since they are not very leafy and are not relished by stock, they have not become popular.

Bunion, a small, hard, painful tumor, formed in any part of the foot, but especially in the metatarsal joints. It consists in a swelling of the bones themselves, which fact distin-

guishes bunions from corns. It appears to be caused by the pressure of a boot or shoe which is too tight, especially when the feet are a little deformed. The best means to relieve the pain is to remove the causes of the tumor as soon as possible, to give rest to the foot, and to apply lotions and emollient poultices.

Bunker Hill, Mass., an eminence, 110 feet high, in the Charlestown district of Boston, connected by a ridge with another elevation, 75 feet high, named Breed's Hill. These heights are memorable as being the scene of a battle, 17 June 1775, commonly known as the battle of Bunker Hill. The city of Boston was occupied by the British under Gen. Gage, who had resolved to begin offensive operations against the rebels. This design becoming known in the American camp, it was determined to seize and fortify the heights of Charlestown on the night of 16 June. The execution of this perilous mission was confided to Cols. Prescott and Pepperell at the head of a brigade of 1,000 men; and at dawn of day a strong redoubt was already completed on Breed's Hill. About 1,500 Americans advanced successively to the relief of Prescott, and Gen. Warren entered the redoubt as a volunteer, refusing the command which was tendered to him. At about two thirty o'clock, two columns of the British advanced to a simultaneous assault; they were received with a terrific fire, and were twice repulsed in disorder. When the Americans had exhausted all their ammunition, Prescott gave the order for retreat. They received a destructive volley as they left the redoubt, and Warren fell, shot through the head with a bullet. The retreat was harassed by a raking fire from the British ships and batteries, but there was no pursuit beyond Charlestown Neck. The British loss was 226 officers and men killed, and 828 wounded; that of the Americans 145 killed or missing, and 304 wounded. Although a defeat, the moral result of this action was great. The Americans had seen superior numbers of the disciplined soldiers of England retreat before their fire, and had given the proof that they were able to defend their liberties. On Breed's Hill, and near the spot where Warren fell, stands the Bunker Hill Monument, the corner-stone of which was laid by the Marquis de Lafayette, 17 June 1825. This monument was inaugurated 17 June 1843. It consists of a plain granite shaft, 220 feet high, 31 feet square at the base, and 15 at the top. The monument affords a magnificent panoramic view of the surrounding country.

Bunner, Henry Cuyler, American author: b. Oswego, N. Y., 3 Aug. 1855; d. Nutley, N. J., 11 May 1896. He became a journalist in 1873, and was editor of 'Puck' from shortly after its start till his death. He was author of 'A Woman of Honor' (1883); 'Airs from Arcady and Elsewhere' (1884); 'The Midge' (1886); 'The Story of a New York House' (1887); 'Zadoc Pine and Other Stories' (1891); 'Short Sixes' (1891); 'The Runaway Browns' (1892); 'Jersey Street and Jersey Lane' (1896).

Bun'ning, Herbert, English composer: b. London, 2 May 1863. He graduated from Brasenose College, Oxford, and was for a time lieutenant in the 4th Hussars, but resigned his commission to study music in France and Italy. He remained abroad four years (1886-90), and after his return to England was musical director

in the Lyric Theatre, 1892-3, and in the Prince of Wales Theatre, 1895-6. Among his musical compositions are 'Shepherd's Call'; 'Village Suite'; and 'La Princesse Osra,' an opera produced at the Royal Opera, Covent Garden, in July 1902.

Bun'odont, a term applied to animals in which the crowns of the molar teeth are composed of a number of low rounded cones or cusps. The pig is one of the best examples among living animals; the teeth of monkeys and other omnivorous or frugivorous animals, including man, are also of this type. It is probable that the molars of many if not all modern mammals have been evolved from bunodont teeth, for the ancestors of many races of the modern hoofed animals, carnivora, and some other groups, show a series of stages in the evolution of the teeth leading from the omnivorous bunodont type into the specialized grinding or cutting teeth (selenodont) of the modern animals. See: SELENODONT; TEETH TRITUBERCULAR.

Bun'sen, Christian Karl Josias (CHEVALIER), German statesman and philosopher: b. Korbach, Waldeck, 25 Aug. 1791; d. Bonn, 28 Nov. 1860. He studied philology under Heyne at Göttingen, and subsequently went to Holland and Denmark, to acquire a critical knowledge of the Danish and Dutch languages. In 1815 he made the acquaintance at Berlin of the celebrated Niebuhr, and in 1816 proceeded to Paris, where he studied Persian and Arabic under Sylvestre de Sacy. The same year he visited Rome, where he married, and renewed his intimacy with Niebuhr, then Prussian ambassador at the papal court. Niebuhr procured him the appointment of secretary to the Prussian legation, and in 1823 Bunsen assumed Niebuhr's duties, being later, and in 1827, formally accredited as resident Prussian minister. In this capacity he continued till 1838, and conducted several important negotiations with the papal see, the result of one of which was the brief of Leo XII. relative to mixed marriages. His next mission was to Berne, as ambassador to the Swiss Federation. During his residence at Rome Bunsen had industriously pursued his philosophical and historical studies, including more especially that of the Platonic philosophy, and investigations into the religious and ecclesiastical history of mankind. The liturgies of the Church received his especial attention, and a service of his own framing, introduced by him into the chapel of the Prussian embassy at Rome, was printed by order of the king of Prussia, who wrote a preface to it. This work was published without the author's name at Hamburg in 1846, under the title of 'Allgemeines Evang. Gesang-und Gebetbuch' ('General Hymn and Prayer Book of the Evangelical Lutheran Church'), and may be regarded as a new edition of the 'Versuch Eines Allgemeinen Evang. Gesang-und Gebetbuchs,' published at Hamburg in 1833.

In 1841 Bunsen was summoned to Berlin from Switzerland to proceed to England in charge of a mission for the establishment, in conjunction with that country, of a bishopric at Jerusalem. Shortly afterward he was nominated Prussian ambassador to England. In 1844 he was consulted on the subject of granting a constitution to Prussia, and is said to have drawn

up and submitted to government the form of one which bore a very close resemblance to that of Great Britain. In the Schleswig-Holstein affair he strenuously supported the claims of Prussia and the German Confederation in opposition to those of Denmark. From the opposite views taken by him to those of his government in relation to the Russian war he was recalled from London in 1854, and, abandoning politics, retired to Heidelberg to devote himself exclusively to literary pursuits. The results of these have established his reputation as one of the most profound and original critics in the department of biblical and ecclesiastical history. Among these are 'Die Verfassung der Kirche der Zukunft' ('The Constitution of the Church of the Future') (1845); 'Ägyptens Stelle in der Weltgeschichte' ('Egypt's Place in the World's History') (1845); 'Hippolytus und Seine Zeit' ('Hippolytus and His Time') (1851); and lastly, his greatest work, 'Bibelwerk für die Gemeinde' ('Bible Commentary for the Community'), the first part of which was published in 1858, and was intended to be completed in 1862. It had occupied his attention for nearly 30 years, and, as he informs us, was regarded as the grand centre-point to which all his literary and intellectual energies were to be devoted. Death interposed to prevent him completing his undertaking. Ill health caused him to spend the winters of 1858-9 and 1859-60 at Cannes, in the south of France, returning thence in the spring of 1860 to Bonn (whither he had recently transferred his abode from Heidelberg), where he died. Three volumes of his 'Bibelwerk' had been published at his death (the first, second, and fifth), and this great work was completed in his spirit and by the aid of his manuscripts under the editorship of Holtzmann and Kamphausen, in nine volumes (1858-70).

Bunsen, Robert Wilhelm Eberard, German chemist: b. Göttingen, 31 March 1811; d. 16 Aug. 1899. He studied at Göttingen University, and at Paris, Berlin, and Vienna; was appointed professor at the Polytechnic Institute of Cassel 1836; extraordinary professor at the University of Marburg 1838, and ordinary professor there 1841; professor at Breslau 1851; and finally professor of experimental chemistry at Heidelberg 1852. Among his many discoveries and inventions are the production of magnesium in quantities, magnesium light, spectrum analysis, and the electric pile and the burner which bear his name (see below). Among his works are 'Chemische Analyse durch Spektralbeobachtungen' (with Kirchhoff, 1861; new ed. 1895); 'Gasometrische Methoden' (1857; English by Roscoe); and 'Anleitung zur Analyse der Aschen und Mineralwasser' (1874). He retired from active teaching in 1880.

Bunsen Battery, a modification of the Grove battery, plates or bars of gas coke being used instead of platinum. The electromotive force is slightly less than that of the Grove battery.

Bunsen Burner, a form of gas-burner especially adapted for heating, consisting of a tube in which, by means of holes in the side, the gas becomes mixed with air before consumption, so that it gives a non-illuminating, smokeless flame. Burners of this nature are part of the indispensable outfit of a chemical laboratory.

BUNTINGS, CANARIES, ETC.



1 Lapland Longspur Bunting.

2 Chaffinch

3 Wild Canary

4 Meadow Bunting

5 Cardinal

6 Rose-breasted Grosbeak (Male).

7 Reed Bunting (Male and Female)

BUNT — BUNYAN

Bunt, sometimes called **Smut Ball**, **Pepper Brand**, and **Brand Bladders**, the most formidable disease, perhaps, to which wheat is subject, but one which may in most instances be greatly modified, and which seldom in the present day does material injury, except where there is careless cultivation. Like many other of the diseases to which the cereal plants are subject, it arises from the attack of a parasitic fungus (*Uredo caries*). It is generated in the ovary of wheat and a few other *Gramineæ*, and very rarely on the stem. It is formed at an early stage of growth, before the ear is free from the sheath; and indeed the plants which are affected by the parasite may be readily recognized by their unusual luxuriance, being generally several inches higher than plants not affected, larger in bulk, and often producing a greater number of stems from the same root. The bunted grains are shorter and blunter than the sound, of a dark-green when young, but when old of a pale brown, or sometimes nearly black. The contents of the ovary are reduced to a uniform black powder or paste, which has an offensive smell like that of decayed fish. Various substances have been used by cultivators to prevent the growth of bunt, such as salt, quicklime, arsenic, corrosive sublimate, etc. Careful washing and a selection of good seed will alone prevent much mischief, but it is advisable to take some more stringent measures with a view to destroy the vitality of the bunt spores. For this purpose Dombrasle's method is the most successful. It consists in thoroughly wetting the grain with a solution of sulphate of soda (Glauber's salts), then drying the wheat with quicklime, which combines with the water to make sulphate of lime (gypsum), which acts as a manure, while the caustic soda destroys the vegetative powers of the bunt spores.

Bunter Sandstone, one of the three great divisions of Triassic formation. It is the lowest, that is, the oldest, of the series. It corresponds to the *grès bigarré* (variegated freestone or grit) of the French. In the Harz it is more than 1,000 feet thick; in Cheshire and Lancashire, England, about 600. The footprints formerly known as those of chirotherium, now known to be labyrinthodont, are found in the bunter; the plants are chiefly ferns, cycads, and conifers.

Bunting, Jabez, English clergyman: b. Monyash, Derbyshire, 1778; d. London, 16 June 1858. His parents were members of the Wesleyan Church and removed to Manchester when he was a child. While at school he attracted the attention of Dr. Percival, who employed him as his amanuensis, and at his death made him one of his executors. He early joined the Church; became a traveling preacher in 1799; joined the Conference after the death of Mr. Wesley, and was appointed to the Oldham circuit. After traveling four years he was sent to London, where he gained great popularity as a pulpit and platform orator. After remaining two years in London he was removed to Manchester, where he distinguished himself as an advocate of ecclesiastical order and discipline in a controversy with some disaffected Methodists. In this controversy he gave such evidence of a knowledge of the polity of Wesleyan Methodism as secured for him the favor of the entire body to which he belonged. He was four times presi-

dent of the Methodist Conference; 17 years missionary secretary; and three years as editor. In 1835 he was chosen president of the theological school, and was looked upon as the acknowledged leader of the Methodists, superintending the interests of the body at home and abroad, while, at the same time, his influence was felt in other evangelical denominations, and also in the political world, statesmen frequently resorting to him for advice. Yet he derived only the ordinary emoluments of a Methodist minister — a yearly salary of £150, with house-rent and taxes. During all the distractions connected with the secessions that have taken place in the Wesleyan body, Dr. Bunting remained a firm, unwavering adherent and advocate of the doctrines and discipline of the Church as they came from the hands of John Wesley, and to his influence and indefatigable zeal are largely to be ascribed the permanency and prosperity of the Wesleyan connection.

Bunting, one of a group of cone-billed birds, forming the genus *Emberiza*, represented in Europe by several large, brown-streaked, or yellowish finches, of which the corn-bunting, reed-bunting, and curl-bunting (qq.v.) are well known in Great Britain. The term is used in the United States for two or three similar birds, such as the dick-cissel, and snow-bunting (qq.v.). All the buntings are good singers, and the term is applied by dealers in cage birds not only to the true European buntings, but to many other seed-eaters, such as the ortolan and our indigo-bird.

Bunting, a thin woolen stuff, of which flags are usually made; hence, flags, collectively.

Bun'ya-bun'ya, the native Australian name of the *Araucaria bidwillii*, a fine Queensland tree with cones larger than a man's head, containing seeds that are eagerly eaten by the natives.

Bun'yan, John, English author: b. Elstow, near Bedford, 1628; d. London, 31 Aug. 1688. He came of a family which had long been established in Bedfordshire, and was the first son of the second marriage of his father, Thomas Bunyan, his mother's name being Margaret Bentley. After receiving a very scanty education, he followed his father's employment as a tinker, and for some time led a wandering, irregular life. During the civil war he served as a soldier, and his mind became impressed with a deep sense of religion. This reformation was powerfully assisted by the piety of his wife, whom he married in 1648 or 1649, and who died about seven years later. He joined a Nonconformist body at Bedford, and in 1657 formally undertook the office of public teacher among them. Acting in defiance of the severe laws enacted against dissenters from the established Church after the Restoration, Bunyan was arrested not far from Bedford, 12 Nov. 1660, and was committed to the county jail for trial. He was indicted at the quarter-sessions early in 1661, and after an irregular trial was sentenced to three months' imprisonment, to be followed by banishment if he persisted in his determination to repeat his offense. He could not be induced to moderate his zeal, and consequently, though not banished, he lay in prison almost continuously till 1672. To this confinement he owes his literary fame, for in the solitude of his cell, his ardent imagination, brooding over the mysteries of Christianity, the miraculous narratives of the Bible, and the

BUNZLAU — BUOY

visions of Jewish prophets, gave birth to that admired religious allegory, the 'Pilgrim's Progress,' — a work which, like 'Robinson Crusoe,' has remained unrivaled amidst a host of imitators. A recent biographer, the Rev. J. Brown, is, however, of opinion that Bunyan's greatest work belongs to a subsequent six months' imprisonment in 1675. The first edition appeared in 1678, but in the editions of 1679 and 1680 many of the most celebrated characters appeared for the first time. The second part of the work, describing the journey of Christian's wife and children, was published in 1684. His 'Holy War Made by Shaddai upon Diabolus' (1682), his other religious parables, and his devotional tracts, which are numerous, are also remarkable, and many of them valuable. There is a curious piece of autobiography of Bunyan extant, entitled 'Grace Abounding to the Chief of Sinners' (1666). On obtaining his liberty Bunyan resumed his functions as a minister at Bedford and became extremely popular. In 1692 his friend, Charles Doe, began a folio edition of his works, which was not, however, completed; and the first complete edition did not appear till 1736. Another was published in two folio volumes in 1767, and since then several have appeared. Of 'Lives' we may mention those by Southey (1830), Macaulay (1853), Offor (1862), Venables (1879), Froude (1880, 'English Men of Letters'), Copner (1883), and Brown (1888).

Bunzlau, boontz'low, the name of several European towns:

1. A town of Prussia, in the province of Silesia, near the Bober, 25 miles west of Liegnitz. It was formerly surrounded by fortifications, but handsome promenades now cover most of the area once occupied by them. In the market-place is an iron obelisk to the Russian general, Kutusov, who died here in 1819. Earthenware, glass, iron, etc., are manufactured. Pop. (1895) 13,870.

2. **JUNG BUNZLAU**, a town of Bohemia, 31 miles northeast of Prague, the capital of the circle of Bunzlau. It stands on the left bank of the Iser, is well built, and has an old castle, an old and a new town-house, and other interesting buildings. Its inhabitants are chiefly engaged in manufacturing cottons, woollens, starch, sugar, spirits, beer, etc. Pop. (1890) 11,518.

3. **ALT BUNZLAU**, a small town of Bohemia, situated on the Elbe.

Buol-Schauenstein, bwäl-show'en-stîn, **Karl Ferdinand** (COUNT), Austrian statesman: b. 17 May 1797; d. Vienna, 28 Oct. 1865. He was minister in succession at Carlsruhe, Stuttgart, Turin, and St. Petersburg. He was second Austrian plenipotentiary at the Dresden Conference (1850), after which he was minister at London until the death of Schwarzenberg recalled him to Vienna to hold the portfolio of foreign affairs. He presided at the Vienna Conference in 1855, and represented Austria at the Congress of Paris.

Buonaparte, bwō-nā-pār'tě. See **BONA-PARTE**.

Buonarotti, bwō-nār-rōt'tě, **Filippo**: b. Pisa, 11 Nov. 1761; d. Paris, 15 Sept. 1837. He received an excellent education under the auspices of the Grand Duke Leopold, but forfeiting the friendship of that prince on account of his sym-

pathies with the French revolutionists, he resorted to Corsica, where he commenced a journal of so inflammatory a character that he became involved in difficulties with the government. After having spent some time in Sardinia, where he was invited to draw up a liberal constitution for the people, he went to Paris to urge the desire of the people of the Corsican island of St. Pierre for annexation to France. French citizenship was conferred upon him; he was employed in important missions in Corsica and Oneglia, and became an ardent partisan of the Terrorists. Having been detained for some time in prison after the fall of Robespierre, he founded the Pantheon Association, and when this was dissolved by the government he joined the conspiracy of Babeuf and was sentenced to transportation, but was finally permitted to retire to Geneva, and afterward went to Brussels, where in 1828, he published his 'Conspiracy de Babeuf.' Returning to Paris after the revolution of 1830, he spent the rest of his life in poverty and obscurity.

Buonarroti, Michael Angelo. See **MICHEL-ANGELO**.

Buononcini, Giovanni Battista, jō-van'ně bāt-tě's'ta bwō-nōn-chě'ně, Italian composer: b. Modena, 1672. In 1697 he went to Vienna and soon after to Berlin, where his opera 'Poli-femo' had great success. After living a while at Rome, he went, in 1720, to London, and became there one of the most powerful rivals of Handel. Everything in England at that time was made to bear upon party politics, and Buononcini became the favorite of the Whigs, while Handel was supported by the Tories. But upon a trial of skill, in an opera of their joint composition, the talent and taste of Buononcini proved an unequal match for the genius of his rival.

Buontalenti, Bernardo, bër-nār'do bwōn-tā-lèn'tě (DELLE GIRANDOLE), Italian painter, sculptor, and architect: b. Florence, 1536; d. 6 June 1608. When 11 years of age an inundation of the Arno broke into the quarter of Florence where his family resided, and carried off every member of it except himself. Cosmo de Medici, on learning the disaster, received him into his palace, and improved the taste which he had displayed for drawing by placing him in the schools of Salviati, Bronzino, and Vasari. He displayed great versatility of mind, and excelled not only in the kindred arts of painting, sculpture, and architecture, but distinguished himself as a mathematician, a military engineer, and an inventor of machines.

Buoy, boo'ī, any floating body employed to point out the particular situation of anything under water, as of a ship's anchor, a shoal, etc. They are of various shapes and constructions. The can buoy is of a conical form and is used for pointing out shoals, sand-banks, etc. Channel buoys are usually painted red on the star-board hand coming in from sea, and black on the port hand. They are also numbered in order from seaward, with even numbers on the star-board and odd numbers on the port hand. The cask buoy is in the form of a cask; the larger are employed for mooring, and are called mooring buoys. Spar buoys are wooden poles weighted at the thick end, by which they are moored. They are used in inland waters and in situations where, by reason of ice, iron buoys

BUPALUS — BURBRIDGE

would be damaged in winter. Whistling buoys are provided with apparatus, operated by the waves, which compresses air and discharges it through a whistle. A bell buoy is a large fixed buoy to which is attached a bell which is sounded by the heaving of the sea, serving as a signal in foggy weather. The life or safety buoy is intended to keep a person afloat till he can be taken from the water. Its most usual form is a ring of cork covered with painted canvas and having becketts at its circumference. Life buoys are sometimes equipped with a port-fire or signal light which is kindled by pulling a lanyard at the moment of heaving overboard. Gas buoys are charged with compressed gas and provided with a suitable burner. The gas being lighted, and burning continuously, such buoys serve as a guide at night. Electric buoys are illuminated by connection with power on shore by means of a cable.

Bupalus, bū'pa-lūs, Greek sculptor: fl. at Chios about 500 B.C. He and his brother Athenis are best known for their satirical conflict with the poet Hipponax. Augustus adorned many of the Roman temples with works of the two brothers, who used the pure white marble of Paros. Pausanias represents Bupalus as being an elegant architect as well as a sculptor.

Buphaga, bū-fa-ga, a genus of birds of the starling family (*Sturnida*), whose species are found in various parts of Africa, where they are of great use from their habit of feeding on the parasites infesting cattle. They are popularly known as beef-eaters or ox-peckers, and are distinguished from the true starlings by a stouter beak, bare nostrils, more curved claws, and some other characters. The South African ox-pecker (*B. africana*) inhabits Natal, while farther north the genus is represented by a red-billed species (*B. erythrorhyncha*). A third species is found still farther north and also in the Transvaal.

Buphonia, bū-fō'nyā (Gr. *βουφώνος* ox-killer), an ancient Athenian festival in honor of Zeus, celebrated every year on the 14th of Scirophorion, on the Acropolis. Barley and wheat were placed on the altar, and the ox destined for the sacrifice was permitted to go and eat the grain, when a priest armed with an axe sprang forward and slew the ox, and then secreted himself. The other priests, as if not knowing the author of the deed, made inquiry, and, failing to ascertain anything, for lack of a better victim arraigned the axe, found it guilty, and condemned it. The Buphonia were also called Diipolia.

Buprestidæ, bu-prēs'tī-dē, a family of coleopterous insects (beetles), many of which are remarkable for the splendor of their appearance. This family is included in the pentamerous section of *Coleoptera*, which was formed by Latreille, and so named because the members of it have five joints in the tarsi. The characters of the *Buprestidæ* are: body ovate, elongated, somewhat broad and obtuse in front, but pointed behind; eyes oval, with the antennæ inserted between them; jaws powerful. They walk slowly, but fly with great rapidity, especially in warm weather. They are very fond of sunning themselves on bushes or the branches of trees. When one attempts to seize them, sometimes even when one approaches them, they allow themselves to fall suddenly to the earth,

or fly rapidly away. There are several hundred species belonging to this family, most of which are found within the tropics, and the tropical species are those which are chiefly distinguished by the brilliancy of their colors. The prevailing color appears to be green, but species are often found of a blue, red, golden, or other color. The *Buprestis gigas* of Linnaeus, which is about two inches in length, and one of the largest of the family, has bright golden elytra, or wing-cases, which are often used as ornaments by the inhabitants of South America, of which continent it is a native.

Bur-marigold, a large genus of annual and perennial herbs (*Bidens*), of the natural order *Compositæ*, mostly natives of North America, but widely distributed in other countries, chiefly as weeds, but some as garden plants. The best-known ornamental species is *B. grandiflora*, a native of South America; and the most common North American species is *B. frondosa*, which is popularly and variously known as devil's boot-jack, stick-tight, beggar-tick, Spanish-needle, etc., and is especially troublesome in wool and on clothing, to which the seeds stick like burs.

Bur'bage, Richard, English actor: b. about 1567; d. London, 1619. He was the son of James Burbage (d. 1597), also an actor, and the first builder of a theatre in England. He was a member of the same company as Shakespeare, Fletcher, Hemming, Condell, and others, and filled all the greatest parts of the contemporary stage in turn. He was the original Hamlet, Lear, Othello, and Richard III., and played the leading parts in the plays of Beaumont and Fletcher, Ben Jonson, Webster, Marston, etc.

Burbank, Luther, American naturalist: b. Lancaster, Mass., 7 March 1849. His boyhood was passed on a farm, where he became devoted to nature study, especially plant life. In 1875 he removed to Santa Rosa, Cal., where he has since conducted Burbank's Experiment Farms. He is the originator of the Burbank potato; Gold, Wickson, Apple, October Purple, Chalco, America, and Climax plums; Giant and Fragrance callas; Giant, Splendor, and Sugar prunes; Peach-blow, Burbank, and Santa Rosa roses; and various new apples, peaches, nuts, fruits, flowers, and vegetables. By a series of experiments he has succeeded in developing from the Lawton blackberry that curious anomaly a white blackberry, which he has named the Iceberg.

Bur'bot, a fresh-water fish (*Lota lota*) of the cod family, inhabiting northern Europe and America. It is numerous in the inland waters of the northern States and Canada, where it displays the nocturnal voracity of its race. It ordinarily weighs about five pounds, but has little market value. It is more often called cusk, ling, or loche among us, than burbot, which is the British designation.

Burbridge, Stephen Gano, American soldier: b. Scott County, Ky., 19 Aug. 1831; d. 1894. He organized the famous 26th Kentucky Regiment, which he led for the Union at Shiloh, where he was promoted to the rank of brigadier-general of volunteers. He was engaged in the Vicksburg expedition under Gen. Grant; led the charge at Arkansas Post and at Port Gibson, being the first to enter each of these places; was retired with the brevet of major-general in 1865.

Burchard, Samuel Dickinson, American clergyman: b. Steuben, N. Y., 6 Sept. 1812; d. Saratoga, N. Y., 25 Sept. 1891. He was for many years a Presbyterian pastor in New York. During the presidential campaign of 1884 a company of clergymen, about 600 in number, called on James G. Blaine, the Republican candidate, at the Fifth Avenue Hotel, New York. Dr. Burchard made an address, in which he affirmed that the antecedents of the Democracy were "rum, Romanism, and rebellion," and this denunciatory speech on the very eve of the election created intense excitement throughout the United States and alienated from Blaine many Democratic votes upon which he had reckoned. It is generally conceded that Burchard was thus largely instrumental in electing Grover Cleveland.

Bur'chell, William John, English explorer: b. Fulham, about 1782; d. 1863. He was in the service of the East India Company on the island of St. Helena, 1805-10, and then went to South Africa. Here he spent several years in exploring and making a large natural-history collection. In 1825 he made a tour in South America. On all his expeditions he was generally entirely alone. A large part of his collections are now in the British Museum.

Burchiello, Domenico, dō-mā-nē'kō boor-kē-čl'ō, Italian poet: fl. 15th century, at Florence, where he was probably born. He was the son of a barber named Giovanni, and was called originally only Domenico. He assumed the name of Burchiello afterward for reasons that cannot be assigned. His fame began about 1425. He was first registered as a barber in 1432. Some writers have reproached him for shameful vices, and represented him as a low buffoon who did everything for money. Others have defended him. His shop was so famous that learned and unlearned, high and low, assembled there every day, and Cosmo the Great caused a picture of it to be painted on one of the arches of his gallery. It appears here divided into two portions; in one Burchiello is acting the part of a barber; in the other that of a musician and poet. The portrait of Burchiello himself is painted over his shop. It is extremely difficult to decide upon the absolute value of his satires, as the local and personal allusions in them are obscure. They were composed for his contemporaries, with a studied obscurity and extravagance of expression. His style is, nevertheless, pure and elegant. His burlesque sonnets are enigmas, of which we have no intelligible explanation, notwithstanding what Doni has done. The narrative and descriptive parts are very easy to be understood; but the wit they contain is, for the most part, so coarse, that the satire fails of producing its effect. They are, on the whole, lively, but licentious. The best editions of his sonnets are those of Florence, 1568, and of London, 1757.

Burckhardt, boork'hart, Johann, yō'hān, Karl, German astronomer: b. Leipsic, 30 April 1773; d. 22 June 1825. He acquired a fondness for astronomy from the study of the works of Lalande, and made himself master, at the same time, of nearly all the European languages. He wrote a Latin treatise 'On the Combinatory Analytic Method' (Leipsic 1794). He then studied practical astronomy with Baron von Zach at the latter's observatory on the See-

berg, near Gotha, and assisted his patron, from 1795-7, in observing the right ascension of the stars. Von Zach recommended him to Lalande, at Paris, who received him at his house 15 Dec. 1797. Here he distinguished himself by the calculation of the orbits of comets; participated in all the labors of Lalande and those of his nephew Lefrançois Lalande; took an active part in the observatory of the Ecole Militaire; and translated the first two volumes of Laplace's 'Mécanique Céleste' into German (Berlin 1800-2). Being appointed adjunct astronomer by the board of longitude, he received letters of naturalization as a French citizen 20 Dec. 1799. His important treatise on the comet of 1770, which had not been visible for nearly 30 years, although, according to the calculations of its orbit, it should have returned every five or six, was rewarded with a gold medal by the Institute in 1800. This treatise, which proposed some improvements in Dr. Olbers' mode of calculation, is contained in the 'Memoires de l'Institut' for 1806. During this year he was made a member of the department of physical and mathematical sciences in the Academy; in 1818 was made a member of the board of longitude; and, after Lalande's death, astronomer in the observatory of the Ecole Militaire. In 1814 and 1816 he published in French, at Paris, 'Tables to Assist in Astronomical Calculations.' He also wrote some treatises in Von Zach's 'Geographical Ephemerides.' His labors in the board of longitude were particularly valuable.

Burckhardt, Johann Ludwig, yō'hān lood'-vīg boork'hart, Swiss explorer: b. Lausanne, 24 Nov. 1784; d. Cairo, 17 Oct. 1817. He studied at Leipsic, Göttingen, and London, giving special attention to Arabic. In 1809 he started on an expedition to Africa for the African Association at London; assuming the disguise of an Oriental at Malta he went to Aleppo and remained there over a year and a half studying Arabic and the history of Mohammedanism. Then he visited Damascus and traveled through Palestine to Cairo, arriving there in September 1812; here he joined a caravan going through the Nubian Desert by a route never before traveled by Europeans, and reached the Red Sea in July 1814. He then crossed over to Asia Minor and went to Mecca, where he became a Moslem and joined a body of pilgrims going to Mount Ararat. In 1815 he returned to Cairo and from there traveled through the region of Mount Sinai, climbing the mountain. Shortly after his return from this trip he died of the fever just as he was about to start on another expedition. He was the author of 'Travels in Nubia' (1819); 'Travels in Syria and the Holy Land' (1822); 'Travels in Arabia' (1829); 'Notes on the Bedouins and Wahabys' (1830); 'Arabic Proverbs' (1830).

Bur'dekin, a river of the northeast of Queensland, with a course of about 350 miles. With its affluents it waters a large extent of country, but it is useless for navigation.

Burden, Henry, American inventor: b. Dumblane, Scotland, 20 April 1791; d. Troy, N. Y., 19 Jan. 1871. He was brought up on a farm, and at an early age showed his inventive genius by making a variety of labor-saving machinery, including a threshing-machine. He came to the United States in 1819 and engaged in the manufacture of agricultural implements.

He invented an improved plow; the first cultivator made in this country; machines for making horse-shoes and hook-headed spikes used on railroads; a self-acting machine for rolling iron into bars; and a new machine for making horse-shoes, which received a rod of iron and turned out completed shoes at the rate of 60 a minute.

Burden of Proof, in legal procedure, the obligation to establish by evidence certain disputed facts. As a general rule this burden lies on the party asserting the affirmative of the issue to be tried or question in dispute, or on the party who would fail if no evidence were adduced on either side. Burden of proof is to be distinguished from *prima facie* evidence or a *prima facie* case. Generally, when the latter is shown, the duty imposed upon the party having the burden will be satisfied; but it is not necessarily so. In criminal cases, on the two-fold ground that a prosecutor must prove every fact necessary to substantiate his charge against a prisoner, and that the law will presume innocence in the absence of convincing evidence to the contrary, the burden of proof, unless shifted by legislative interference, will, in criminal proceedings, be on the prosecuting party, though in order to convict he must necessarily have recourse to negative evidence. The burden of proof throughout is on the government. This subject is treated by all writers on Evidence, as Taylor, Roscoe, and Powell in England; Dickson in Scotland; and Greenleaf in the United States. Consult also Bentham's 'Rationale of Judicial Evidence.'

Burdett, Sir Francis, English politician: b. 25 Jan. 1770; d. 23 Jan. 1844. He was educated at Westminster, and after two years at Oxford made a Continental tour. In 1796 he obtained a seat in Parliament through the patronage of the Duke of Newcastle; but he soon abandoned the Tory party and made himself conspicuous by his advocacy of liberal measures. In 1802 he stood for Middlesex, but though at first elected he finally lost his seat in 1806, after much costly litigation. He was more successful in 1807 at Westminster, where his election at the head of the poll was hailed as a great popular triumph. In 1810 he published a letter in Cobbett's 'Political Register,' denying the right of the House of Commons to imprison for libel, as they had recently done in the case of John Gale Jones. This letter, having been brought under the notice of the House, was declared a gross breach of its privileges, and a warrant was issued by the speaker for the committal of Sir Francis to the Tower. He denied the legality of the warrant, and declared his determination to surrender only to force. The public mind was strongly agitated; but prorogation of Parliament relieved him from his imprisonment in the Tower, and he became perhaps the most popular man in the kingdom. In attaining this popularity he was greatly aided by the graces of his appearance and the talents which he undoubtedly possessed. Ultimately, however, his fervor cooled, and he owed his last seat in Parliament to the Conservatives of Wiltshire.

Burdett, Sir Henry, English publicist and statistician: b. 1847. He served in an administrative capacity in the Queen's Hospital, Birmingham, and the Seaman's Hospital, Green-

wich, and was secretary of a department of the London Stock Exchange. He was founder and editor of 'The Hospital.' His works are numerous, and cover a wide range. Among them are 'Official Intelligence of British, American, and Foreign Securities' (17 vols.); 'The National Debt'; 'National Debts of the World'; 'Local Taxation in England and Wales'; 'Colonial Loans, Finance, and Development'; 'Seventeen Years of Securities'; 'The Admiralty and the Country'; 'Hospitals and Asylums of the World'; 'Hospitals and Charities, a Year-book of Philanthropy'; 'Hospitals and the State'; 'Architects, Hospitals, and Asylums'; 'A Practical Scheme for Old Age Pensions'; 'The Nursing Profession'; 'Housing of the Poor'; and 'Official Nursing Directory.'

Burdett-Coutts, Right Hon. Angela Georgina (BARONESS), English philanthropist: b. (daughter of Sir Francis Burdett, q.v.), 21 April 1814. In 1837 she inherited much of the property of her grandfather, Thomas Coutts, the banker, on the death of his widow, the Duchess of St. Albans (formerly the actress, Miss Mellon). Besides spending large sums of money in building and endowing churches and schools, she endowed the three colonial bishoprics of Cape Town, Adelaide, and British Columbia. She founded an establishment in South Australia for the improvement of the aborigines, and established a fishery school at the Irish village of Baltimore (1887). To the city of London she presented, besides several handsome fountains, the Columbia Market, Bethnal Green (1870), for the supply of fish in a poor district. She also built Columbia Square, consisting of model dwellings at low rents, for about 300 families. The home established by her at Shepherd's Bush has rendered great assistance to many unfortunate women, and the People's Palace owes much to her generosity. In 1871 she was created a peeress in her own right as Baroness Burdett-Coutts. In 1877 she organized the Turkish Compassionate Fund, to relieve the sufferings of the peasants in Turkey, and in recognition of her services the Sultan conferred upon her the Order of the Medjidie. In 1881 she was married to William Ashmead-Bartlett, who in 1882 obtained the royal license to assume her name.

Burdette, Robert Jones, American humorist: b. Greensboro, Pa., 30 July 1844. He served in the Union army during the Civil War. He is famous for humorous newspaper skits, of rare variety, charm, and unrepentitious freshness; begun in the Burlington (Iowa) *Hawkeye*, of which he became associate editor in 1874. Among his works are: 'The Rise and Fall of the Moustache,' a lecture (1877); 'Hawkeyes,' collected articles (1880); 'Life of William Penn' (1882); 'Sons of Asaph'; 'Chimes from a Jester's Bells'; etc. He was licensed as a Baptist clergyman in 1887.

Burdick, Francis Marion, American jurist: b. De Ruyter, N. Y., 1 Aug. 1845. He was graduated at Hamilton College in 1869, and at its law school in 1872. He practised law in Utica, N. Y., from 1872 to 1883, and was later professor of law at Hamilton College, and at Cornell. Since 1891 he has been professor of law at Columbia. He has written 'Law of Sales'; 'Law of Partnership'; and other legal textbooks.

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Burdock, a small genus (*Arctium*) of coarse perennial or biennial herbs of the natural order *Compositæ*, natives of temperate Asia and Europe, but widely distributed as weeds throughout the world. Common burdock (*A. lappa*), which often attains a height of four feet, is sometimes planted in flower-borders for its foliage, which makes a good screen; and in Japan, where it has been improved by cultivation, for its enlarged parsnip-like roots, which are eaten as a boiled vegetable. Formerly the roots were used in medicine, but they seem to be generally classed with many other domestic remedies of doubtful value. The plant is best known as a weed in waste land, but usually on good soil. Its globular burs become attached to the wool of sheep and to clothing. Their presence injures the price of wool.

Burdwan, bürd-wän, or **Bardwan**, bär-dwan', India, a town and capital of a division of the same name in the lower provinces of Bengal, on the left bank of the Damoda, 68 miles northwest of Calcutta, with which it is connected by railway. There is a titular rajah of Burdwan, who resides here in a spacious palace, with gardens, etc.; and there are also a large collection of temples and a shrine of Pirba-haram. Pop. 34,477. The division has an area of 13,956 square miles, and a population of about 8,250,000, and is divided into the districts of Burdwan, Bankura, Birblum, Hugli, Midnapur, and Howrah. The chief crops are sugar, indigo, tobacco, cotton, and the usual cereals. Mulberry-trees are cultivated, and coal is raised.

Bureau, bü-rō, or bü-rō', the chamber or official apartments of an officer of government, and the body of subordinate officials who labor under the direction of a chief. The term "bureau system," or "bureaucracy," is applied to those systems of government in which the business of administration is carried on in departments, each under the control of a chief; and is opposed to those in which the officers of government have a co-ordinate authority. Sometimes a mixture of the two systems is found. Thus the business of the executive branch of government may be carried on by bureaux, while the administration of justice is in the hands of co-ordinate judges. In the United States, bureau is the universal word for a chest of drawers.

Burette, bü-ret', a graduated glass tube occasionally used for dividing a given portion of any liquid into small quantities of a definite amount.

Burg, Adriaan (ä'drē-än) van der, Dutch painter: b. Dordrecht, 1693; d. 1733. He studied under Arnold Houbraken, distinguished himself by his portraits, and acquired a reputation which would soon have procured him an independence. But intemperate habits rendered his talents of no avail, and hurried him to a premature grave. His freedom of touch and fine coloring are his distinguishing excellences. His best-known pieces are two large pictures at Dordrecht, one of which gives on a single canvas portraits of the managers of the orphan hospital, and the other portraits of the officers of the Mint.

Burg, Johann (yō'hän) Tobias, Austrian astronomer: b. Vienna, 1766; d. 1834. He attracted the notice of Van Swieten, who was then at the head of the commission appointed to reform the scholastic estab-

lishments of Austria, and through his patronage obtained the means of prosecuting the study of mathematics, and more especially of astronomy, for which he showed a decided inclination. In 1791 he became professor of physics at Klagenfurt, and in 1792 was appointed colleague of Trisnecker at the Observatory of Vienna. In 1798, the French Institute having proposed a prize for the determination, by at least 500 observations, of the mean height of the apogee and ascending node of the moon, Burg sent in a memoir in which the determination was made by a most accurate and ingenious method, not after 500 but 3,000 observations. The tables contained in it were afterward published by the Institute, and constitute the chief foundation of his fame. In 1813 he became almost entirely deaf and retired from public life to Wiesenau, Carinthia.

Burg, Prussia, a town in the province of Saxony, 12 miles northeast of Magdeburg, on the Ihle, where it joins a canal uniting the Havel with the Elbe. It has four churches, a hospital, a gymnasium, and a well-endowed institution for the bringing up of orphan children, and is the seat of civil and judicial administration for the circle. Its manufactures are extensive, especially of woollens, for which it was a centre as early as the 12th century. Cloths for army purposes are largely made. There are also spinning mills, dye works, machine works, tanneries, oil works, etc. Pop. (1895) 19,397.

Bur'gage Tenure, in England, a tenure in socage, whereby burgesses, citizens, or townsmen hold their lands or tenements of the king or other lord for a certain yearly rent. In Scotland that tenure by which the property in royal burghs is held under the Crown, proprietors being liable to the (nominal) service of watching and warding, or, as it is commonly termed, "service of burgh, used and wont."

Burgas, boor-gäs', or **Bourgas**, Turkey, a seaport of the province of eastern Rumelia, situated on the Black Sea. The bay on which it stands is of sufficient depth for large vessels, and the exports are grain, iron, butter, wine, and also woolen goods for Constantinople. The principal source of the prosperity of the town is the manufacture of pottery, pipe-bowls, cups, etc., for which a superior clay is found in the neighborhood. Pop. about 12,000.

Burgdorf, boorg'dörf, Switzerland, a town in the canton of Bern, situated on the Emmen. It is the entrepôt for the linen goods and cheeses of the Emmenthal. The castle which stands here was formerly a place of great strength. Pestalozzi resided from 1798 to 1804 in the château of Burgdorf, and converted it into an educational institution. In the vicinity are the baths of Sommerhaus. Pop. 8,400.

Bur'geo Islands, Newfoundland, a group of islands on the southern coast, much visited by summer tourists and artists from the eastern States and Canada. The population is chiefly engaged in fishing. Burgeo, the principal town, has a population of less than 1,000.

Bür'ger, Gottfried August, göt'fräd ow'-goost, German poet: b. 1 Jan. 1748, at Wolmerswende, near Halberstadt; d. Göttingen, 8 June 1794. He showed an early predilection for solitary and gloomy places and the making of verses, for which he had no other model than

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hymn-books. He learned Latin with difficulty. In 1764 he studied theology at the University of Halle, and in 1768 he went to Gottingen, in order to exchange theology for law, but soon formed connections here equally disadvantageous to his studies and his morals, so that his grandfather, who had hitherto maintained him, withdrew his support. The friendship of several distinguished young men at the university was now of great service to him. He studied the ancient classics and the best works in French, Italian, Spanish, and English, particularly Shakespeare, and the old English and Scottish ballads. Percy's 'Reliques' was his constant companion. His poems soon attracted attention. In 1772 he obtained the office of baille in Alten-Gleichen, but throughout his life he was involved in pecuniary difficulties. In 1774 he married the daughter of a neighboring baille, named Leonhart, but his marriage was unfortunate. He conceived a violent passion for the sister of his wife, and married her, in 1784, soon after his first wife's death. She also, his celebrated "Molly," died in the first year of their marriage. At the same time he was obliged, by intrigues, to resign his place. He was made professor extraordinary in Gottingen, but received no salary, and this favorite poet of the nation was obliged to gain his living by poorly rewarded translations for booksellers. A third marriage in 1790, with a young lady of Swabia, who had publicly offered him her hand in a poem, completed his misfortunes; he procured a divorce from her two years afterward. The government of Hanover afforded him some assistance shortly before his death. His songs, odes, elegies, ballads, narrative poems, and epigrams hold a very high place in German literature, Schlegel especially commending his work, though Schiller criticised him very severely. The first collection of his poems appeared in Gottingen in 1778. His complete works were first published by Reinhard at Göttingen in four volumes in 1796-8, and this edition has been repeatedly published since. Other editions of his works and letters have also been published, and his life has been written by Döring, Pröhle ('G. A. Bürger: Sein Leben und Seine Dichtungen,' Leipzig, 1865), and others.

Burger, Ludwig, lood'vīg boor'gēr, German painter and illustrator: b. Cracow, 19 Sept. 1825. He studied at the Berlin Art Academy, at the same time working at book-illustrating, he was also a pupil of Couture in Paris. Among his best drawings are the illustrations for the works of La Fontaine and a collection of 20 plates known as 'Die Kanone.' Since 1869 he has done considerable work in interior decoration, particularly at the Berlin city hall.

Burgers, boor'gērs, Thomas Francis, Transvaal statesman: b. Cape Colony, 1834; d. 1881. He was educated for the ministry at Utrecht and was pastor of the Dutch Reformed Church of Hanover, Cape Colony. Some of the rationalistic views he expressed led to his trial for heresy, but he was acquitted. He was elected president of the Transvaal republic in 1872 and held the office until 1877, when the republic was annexed by Great Britain.

Burges, bër'jēs, Tristram, American statesman and orator: b. Rochester, Mass., 26 Feb. 1770; d. Providence, R. I., 13 Oct. 1853. When 15 years old he attended a school in the vicinity

for six weeks, and again the next year for six weeks more. This was all the instruction he received from others until he reached the age of 21. In September 1793, he entered Rhode Island College, now Brown University, graduated three years later with the first honors of his class, and was admitted to the bar in 1799. He became a leader of the Federal party, and in 1811 was elected to a seat in the State legislature. In 1815 he was made chief justice of Rhode Island, and afterward became professor of oratory and belles-lettres in Brown University. In 1825 he was elected to Congress, and almost immediately achieved a national reputation by his speech on the judiciary. He continued in Congress until 1835. Many of his most brilliant efforts were in defense of the American tariff system, and his logic and sarcasm won for him an unrivaled reputation as a debater. See Bowen, 'Memoirs of Tristram Burges.'

Bur'gess, Alexander, American Protestant Episcopal bishop: b. Providence, R. I., 31 Oct. 1819; d. St. Albans, Vt., 8 Oct. 1901. He was a younger brother of George Burgess, first bishop of Maine. He was graduated from Brown University in 1838, and from the General Theological Seminary in 1841. He was successively rector at East Haddam, Conn., 1842-3; St. Mark's, Augusta, Me., 1843-54; St. Luke's, Portland, Me., 1854-67; St. John's, Brooklyn, N. Y., 1867-9; and Christ Church, Springfield, Mass., 1869-78. In 1878 he was consecrated first bishop of the diocese of Quincy, Ill. He wrote a popular religious text-book, 'Questions for Bible-Classes and Sunday-schools' (1855), and a 'M memoir of the Life of George Burgess, First Bishop of Maine' (1869).

Bur'gess, Edward, American naval architect: b. West Sandwich, Mass., 30 June 1848; d. Boston, 12 July 1891. He was educated at Harvard, where he graduated in 1871, and became secretary of the Boston Society of Natural History. He was instructor of entomology at Harvard from 1879 to 1883. He then became a designer of sailing-yachts. In 1884 he designed the Puritan, the winner of the America's cup in 1885; and a year later the Mayflower, the winner in 1886. He was also the designer of the Volunteer, which won the cup in 1887.

Burgess, Frank Gellett, American humorous writer and illustrator: b. Boston, 30 Jan. 1866. He was graduated from the Massachusetts Institute of Technology in 1887; was a draughtsman with the Southern P. Ry. 1887-90, and instructor in topographical drawing in the University of California, 1891-4. In 1895-7 he came prominently before the reading public as a publisher and writer of eccentric and humorous literature, such as his journal called 'The Lark,' and poem, 'The Purple Cow' (1897). In 1898 he removed to London, but returned to America in 1900. He edited 'Petit Journal des Refusées' (1897), and has written 'The Lark Almanac' (1898); 'Vivette' (1898); 'The Nonsense Almanac' (1898); 'The Lively City o' Ligg' (1898); 'Gooops and How to be Them' (1900); 'A Joyous Journey Round the Year' (1901); 'Romance of the Commonplace' (1902); 'A Gage of Youth' (1901).

Burgess, George, bishop of Maine: b. Providence, R. I., 31 Oct. 1809; d. Haiti, 23 April 1866. After graduating at Brown Uni-

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versity, and holding a tutorship in that college, he traveled in Europe, and studied for two years in the universities of Göttingen, Bonn, and Berlin. He was rector of Christ Church in Hartford from 1834 to 1847, when he was consecrated first bishop of the diocese of Maine, and became, at the same time, rector of Christ Church in Gardiner. Both offices he filled with great ability. He published two academic poems, a metrical version of a portion of the Psalms, 'Pages from the Ecclesiastical History of New England' (1847); 'The Last Enemy Conquering and Conquered' (1850), and various sermons.

Burgess, James, Scottish archæologist: b. Kirkmahoe, Dumfriesshire, 14 Aug. 1832. He went to India in 1855, and there entered upon educational work in Calcutta and Bombay. In 1886 he was made director-general of the archæological surveys of India, retiring under age limit in 1889. From 1872 to 1884 he published the 'Indian Antiquary.' His works include: 'The Temples of Shatrunjaya' (1869); 'The Rock Temples of Elephanta' (1871); 'Scenery and Architecture in Gujarat and Rajputana' (1873); and other books; also many writings in the 'Epigraphia Indica,' 'Archæological Reports' (1874-87), etc.

Burgess, John William, American educator: b. Cornersville, Tenn., 26 Aug. 1844. He was educated at Cumberland University, Lebanon, Tenn., and at Amherst College, Mass., graduating there in 1867; studied law, and began to practise in 1869. During this year he was appointed professor of English literature and political economy at Knox College, Galesburg, Ill. Two years later he studied in Göttingen, Leipsic, and Berlin. On his return, he became professor of history and political science at Amherst, and in 1876 professor of history, political science, and international law in Columbia College, and there in 1880 he was made professor of constitutional and international history and law. He has published 'Political Science and Comparative Constitutional Law' (1890); 'The Middle Period of United States History' (1897); 'The Civil War and the Constitution' (1901); 'Reconstruction and the Constitution' (1902); and numerous magazine essays on kindred subjects.

Burgess, Neil, American actor: b. Boston, 1846. Not long after entering the theatrical profession, he undertook in a stage emergency to fill the place of an actress, and his success in the humorous female role assumed led to his entering that line permanently. He acted in 'Josiah Allen's Wife' and in 'Widow Bedott.' The latter was very popular, as was also 'Vim,' produced in 1883. 'The Country Fair,' a play which he brought out in 1889, ran for more than two years. Mr. Burgess has lately undertaken vaudeville acting.

Burgess, a word used in somewhat varying senses, but generally meaning a freeholder, or a person invested with all the privileges of a citizen in a borough or corporate town. Those entered on the burgess roll of English boroughs are householders who have resided and paid rates for 12 months prior to July in any year. In the United States the uses of the word have undergone some specific changes, and in States having boroughs as political divisions,

as Connecticut, New Jersey, and Pennsylvania, it carries an implication of magisterial authority. See **BOROUGH**; **BURGH**.

Burgh, *berg*, the same as borough. The spelling borough is the common one in England and the United States, while burgh is that which chiefly prevails in Scotland, as Scarborough, Edinburgh. A burgh of barony, in Scotland, is a certain tract of land created in a barony by the feudal superior, and placed under the authority of magistrates. A royal burgh in Scotland is a corporate body created by a charter from the Crown. There is a convention of royal burghs. In the United States the termination -borough was for generations added to the names of places, as in England; but, under a decision of the United States Board on Geographic Names, the form is now -boro, as Brattleboro.

Burgher, *berg'ér*, the name applied to a former subdivision of the Scottish Secession Church. The Secession, which originated through the withdrawal of Ebenezer Erskine and some other ministers from the Scottish establishment in 1732, split in two in 1747, part having felt free to take, while others refused, what they deemed an ensnaring burgess oath. They reunited in 1820 under the name of the Associate Synod, and, joining with the "Relief" in 1847, formed the United Presbyterian Church.

Burgin, George B., English novelist and journalist: b. Croydon, Surrey, England, 15 Jan. 1856. He became private secretary to Baker Pasha and accompanied him to Asia Minor as secretary of the Reform Commission in Armenia. In 1885 he returned to England and was for a time sub-editor of 'The Idler.' Among his works are: 'The Dance at the Four Corners'; 'Tuxter's Little Maid'; 'The Judge of the Four Corners'; 'Tomalyn's Quest'; 'Fortune's Footballs'; 'The Cattle Man'; 'The Hermits of Gray's Inn'; 'The Bread of Tears'; 'The Tiger's Claw'; 'A Son of Mammon'; 'A Wilful Woman'; 'The Shutters of Silence.'

Burgkmair, Hans, *hänts boork'mër*, German painter and engraver: b. Augsburg, 1473; d. about 1531. He is supposed to have been a pupil of Albert Dürer. Several of his frescoes and paintings in oil upon wood are still preserved in his native town; but though possessed of considerable merit, they have contributed far less to his fame than his woodcuts, in which he at least equaled Dürer, and has scarcely been surpassed by Holbein. Among his most famous works are the 'Triumph of the Emperor Maximilian I.,' embracing 135 cuts, with a text written by that emperor; and a series, 'The Wise King,' including 237 cuts, in which the deeds of the same ruler are represented.

Burglary, at common law, the breaking and entering the house of another in the nighttime, with intent to commit a felony therein, whether the felony be actually committed or not. Burglary at common law, and in its first degree in the statutes of the various States, must, in general, be committed in a mansion-house actually occupied as a dwelling, but if it be left by the owner *animo revertendi*, though no person resides in it in his absence, it is still his mansion. But at common law burglary may be committed in a church. In New York (Penal Code

§ 496), and in some other States in which the New York statute has been adopted, burglary at common law, or in the first degree, must be committed in the night, but in New York and in some other States burglary in the second and third degrees may be committed in the daytime, and it is burglary in the third degree in New York feloniously to enter a building, whether inhabited or not, either in the daytime or night. Before the offense is complete there must be both a breaking and an entry or an exit. An actual breaking takes place when the burglar breaks or removes any part of the house, or the fastenings provided for it, with violence. Constructive breakings occur when the burglar gains an entry by fraud, conspiracy, or threats. The least entry, with the whole or any part of the body, hand or foot, or with any instrument or weapon, introduced for the purpose of committing a felony, will be sufficient to constitute the offense. Burglary is a felony in all of the States, and in North Carolina it may be punished with death or imprisonment. In New York it is punishable as follows: Burglary in the first degree, imprisonment for not less than 10 years; second degree, not exceeding 10 years; third degree, not exceeding 5 years.

Bürglen, a village of Switzerland, in the canton of Uri, about a mile from Altorf, is the traditional birthplace of William Tell. The supposed site of the patriot's house is now occupied by a chapel, erected in 1522, upon the walls of which are represented certain well-known scenes from his history.

Bur'gomaster, the title of the chief magistrate of a city or a large town in Germany and the Netherlands, practically equivalent to mayor.

Burgomaster, a sailor's name for certain large domineering gulls of the genus *Larus*.

Burgos, Francisco Javier de, fran-thès'kō ha'vēr dē boor'gōs, Spanish statesman and poet: b. Motril, Granada, 1778; d. 1845. In his dramatic compositions he sought to restore the classical Spanish comedy. Among them are: 'The Three Equals'; 'The Masked Ball'; and 'The Optimist and the Pessimist.' He wrote a celebrated 'Ode to Reason.'

Burgos, a city of northern Spain, the capital of the province of Burgos, and formerly of Old Castile, and once the residence of its kings. It stands on the declivity of a hill, on the right bank of the Arlanzon. The streets are narrow and dark, the finest in every respect being that called the Huerto del Rey. Places of promenade are numerous; the one most frequented, and justly forming the boast of the town, being the Espolon. The most remarkable structure is the cathedral, one of the finest buildings of the kind in Europe. It was begun in 1221, but was not finished for several centuries. It is built of white marble in the form of a Latin cross, and is about 300 feet long by 200 broad, and its size is such that service can be performed in eight chapels at once without confusion. Its interior, as well as its exterior, is of great magnificence, is adorned with fine carvings and paintings, and contains numerous monuments, in particular the tombs of Don Fernando and the Cid, both natives of Burgos, and celebrated throughout Spain for their heroic achievements in the wars with the Moors. There are several other fine churches,

but the rest of the public buildings are not deserving of notice. The wool of Old Castile passes principally through Burgos, and it has some woollen manufactures. Burgos is the see of an archbishop, and at one time contained a university. Pop. (1900) 31,413. The province of Burgos is bounded on the north by Santander, east by Alava, Logroño, and Soria; south by Segovia, and west by Palencia and Valladolid. The area is 5,650 square miles. Pop. (1897) 340,001.

Burgoyne, bér-goin', John, English general and dramatist: b. 24 Feb. 1723; d. London, 4 Aug. 1792. He was the son of Capt. John Burgoyne, and grandson of Sir John Burgoyne of Bedfordshire, although reputed to be a natural son of Lord Bingley. Educated at Westminster, he entered the army at an early age, and while a subaltern eloped with Lady Charlotte Stanley, daughter of the Earl of Derby. By this alliance his military advancement was secured. After an election to Parliament in 1761, he served with distinction in Portugal, and was sent to America in 1775. He joined Gen. Gage at Boston, with large reinforcements, and witnessed the battle of Bunker Hill, of which he has left an animated description. After proceeding to Canada as governor, he returned to England, but in 1777 was despatched to take command of that expedition from Canada against the United States, the failure of which so largely contributed to the establishment of American freedom. Indeed, few battles have led in their ultimate influence to results so great as did the surrender of Burgoyne with 5,791 fighting men, well provided with artillery, at Saratoga, to the army of Gen. Gates. On his return home, he was received by the king with marked disfavor. Burgoyne did not possess the genius of a great general, and was in many respects utterly inadequate to the tasks imposed upon him, yet no one can read his work written in his own defense, 'State of the Expedition from Canada' (London 1780), without acknowledging his courage, and detecting qualities, which, in a less exalted station, might have been of much service to his country. Disgusted with his treatment by the government, he retired to private life, and devoted his leisure to the production of dramas, some of which, as 'The Maid of the Oaks,' 'The Lord of the Manor,' etc., were highly popular in their day. His best play, 'The Heiress,' has been successful not only in its original tongue, but also in several foreign versions. He was made commander-in-chief in Ireland in 1782, and in 1787 was one of the managers of the impeachment of Warren Hastings, whose trial lasted through several years after Burgoyne's death.

Burgoyne, Sir John Fox, English officer of engineers: b. 24 July 1782; d. 7 Oct. 1871. He was the son of Gen. John Burgoyne; was educated at Eton and at the Royal Military Academy at Woolwich; entered the Royal Engineers in 1798; served at Malta in 1800, in Sicily with Gen. Stewart in 1806, in Egypt in 1807, and in the Peninsula with Sir John Moore and Wellington from 1809 to 1814. He shared in the celebrated retreat on Corunna, and was present at all the sieges, generally as first or second in command of the engineers, and at most of the battles of the Peninsular war,

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in which he was twice wounded. During the War of 1812, he assisted as lieutenant-colonel and chief engineer in the attack on New Orleans. In 1826 he accompanied the army of Gen. Clinton to Portugal in the same capacity. He was appointed chairman of the Board of Public Works in Ireland in 1830 and in 1845 became inspector-general of fortifications in England. He was made a lieutenant-general in 1851, and on the outbreak of the Crimean war was sent to Turkey to provide for the defense of Constantinople. After returning to England he was again sent out to Sebastopol, where he was chief of the engineering department till recalled in 1855. He received the order of the Medjidie from the Sultan of Turkey, was made a general in 1855, the following year was created a baronet, in 1868 a field-marshal, and for some years, up to his death, held the appointment of constable of the Tower of London. In 1859 a work was published in London under the title of 'Military Opinions of Gen. Sir J. F. Burgoyne,' in which many of his official writings were collected.

Burgrass. See SANDBUR.

Bur'grave, a count who in the Middle Ages had command of a castle or burg. Burgraves were appointed to their office by the emperor or by the bishops; and belonged to the nobility by virtue of their office. Their powers differed in different places, but as a rule they were entrusted with keeping the public peace, the oversight of trade and the market, and the command of the troops and the police in their districts. As the free cities grew in power they were separated from the jurisdiction of the burgrave. The office lost its significance in the course of the 13th century, but the title is retained by some princely families to the present time, as, for instance, by the kings of Prussia who have the title of Burgrave of Nuremberg.

Bur'gundy, Louis (DUKE OF), Dauphin of France: b. Versailles, 6 Aug. 1682; d. 18 Feb. 1712. He was grandson of Louis XIV. and father of Louis XV. A boy of ungovernable passions and temper, great haughtiness of bearing, and sensuality of life, he is said to have been much corrected in character and conduct by the influence of his preceptor, the saintly Fénelon. At the age of about 15 he married Princess Adelaide of Savoy; was made generalissimo of the army in 1701; and on the death of his father became heir-apparent to the throne. He was called the Grand Dauphin, and from his relationship to two of the greatest sovereigns of France his figure gains a historical importance out of all proportion to that of his own personality and career.

Bur'gundy, a region of western Europe, so called from the Burgundians, a Teutonic people originally from the country between the Oder and the Vistula. They migrated to the region of the Upper Rhine, and in the beginning of the 5th century they passed over into Gaul, and after a long struggle obtained possession of the southeastern part of this country. Here they founded a kingdom, which had as its seat of government sometimes Lyons and sometimes Geneva; but having become engaged in a war with the Franks, they were at last wholly subdued in 534. More than one kingdom of Burgundy, so called, subsequently arose, as well

as the important county of Burgundy (Upper Burgundy, Franche-Comté); but the most important state of this name was the duchy of Burgundy (Lower Burgundy), consisting principally of the French province Bourgogne (Burgundy, properly so called). The long line of ancient Dukes of Burgundy became extinct in 1361 with the death of Duke Philip, and Burgundy was immediately united by King John of France with the French crown. The dignity of Duke of Burgundy was restored in 1363 by his grant of the dukedom to his youngest and favorite son, Philip the Bold (q.v.). In 1368 he married Margaret, the widow of the last Duke Philip of the old line, only daughter and heiress of Louis III., Count of Flanders, and thereby greatly augmented his possessions, which now included Flanders, Mechlin, Antwerp, and Franche-Comté. In 1402 he was made regent of France, an appointment which gained him the hatred of the king's brother Louis, Duke of Orleans, and led to the struggle between the Orleanist and the Burgundian factions. In 1404 Philip died, and was succeeded by his son, John the Fearless, who was stabbed by the companions of the dauphin in 1419. His son and successor, Philip the Good (q.v.) gained great accessions of territory, including Hainault, Holland, Zealand, Namur, and in 1431 Brabant and Limburg, which reverted to him from a younger branch of his family. In 1441 he also obtained the duchy of Luxemburg. On his marriage with his third wife, Isabella, daughter of King John of Portugal, he founded the order of the Golden Fleece. His son, Charles the Bold (q.v.), who succeeded him in 1467, became the inveterate enemy of Louis XI. of France, and one of the most powerful princes in Europe. He acquired Gueldres in 1475, but perished in the fatal battle of Nancy in 1477, leaving behind him a daughter, Maria, the sole heiress of his states. She married Maximilian of Austria, who thus obtained the Netherlands and Upper Burgundy. The king of France received the dukedom of Burgundy, which he assumed as a male fief. Henceforth the territories that had belonged to Charles shared the fortunes either of France or of the empire. In the empire what was called the circle of Burgundy for a time embraced Franche-Comté and the Netherlands. In the Peace of Madrid, in 1526, Francis I. was obliged to agree to the cession of the duchy of Burgundy to Charles V. of Germany, but the cession was never carried out, and in the Peace of Cambray, in 1529, Charles renounced his claim to it. Franche-Comté was conquered by Louis XIV., and retained by him at the Peace of Nimeguen in 1678. After this time the name Burgundy is best known as designating one of the provinces or governments of France.

Burgundy (called also Burgundy Proper, or Lower Burgundy), formerly a province in the east of France, lying on the west of Franche-Comté, and on the south of Champagne. It now forms the four departments of Yonne, Côte-d'Or, Saône-et-Loire, and Ain. It is one of the most productive regions in France. The principal product is wine. See BURGUNDY WINES.

Burgundy Pitch, the resinous exudation of the stem of the spruce fir (*Abies excelsa* or *Pinus abies*), melted and strained. It is ob-

BURGUNDY WINES—BURITI PALM

tained from Switzerland, but is seldom genuine. It is hard and brittle, opaque, of a dull reddish-brown color, empyreumatic odor, and aromatic taste. It gives off no water when heated, is not bitter, and is free from vesicles. It consists chiefly of resin and a little volatile oil, whence its odor. The resin resembles that of turpentine. Pitch plaster acts externally as a slight stimulant to the skin. Burgundy pitch enters also into the composition of the iron plaster. It takes its name from Burgundy in France, where it was first prepared.

Burgundy Wines, famous French wines, deriving their name from the ancient province of Burgundy. They have a reputation superior to their present popularity. They are nevertheless wines of delicious flavor and bouquet. It has been supposed that they would not well bear a sea-voyage, but it is now settled that when transported to America and back, their quality is greatly improved. The most renowned red wines of Burgundy are Romané-Conti, Clos-Vougeôt, Chambertin, and Richebourg. Chambertin was the favorite wine of Louis XVI. and Napoleon. Chablis, a white wine, has many admirers, but is inferior to the best growths of the Garonne and the Rhone.

Burhānpur, boor-han-poor', a town of the Nimar district, Central Provinces, British India, formerly the capital of Khandesh, is situated on the Tapi River, about 300 miles northeast of Bombay. It is situated on high ground, and is well planned and built. It has a mosque and other buildings worthy of note, and was once famous for its manufactures of gold and silver brocade, muslin, and silks, which still exist to some extent, though the town has long been declining.

Burhel. See BAHRAL.

Buri, boo'rē, the grandfather of Odin, in Norwegian mythology. According to the legends 12 streams flowed from the spring Hvergelmir in Niflheim (the region of shadows), and later in their course were frozen, thus surrounding the region of elemental fire (Muspelheim) with blocks of ice. From this ice came the giant Ymir and the cow Audhumla; from the cow's udder came four streams of milk with which the giant was fed. Audhumla was nourished by licking the salt ice-blocks, and as she licked them a man's hair appeared on the first day; a man's head on the second day and the whole man on the third day; this was Buri. He was of giant size and strength; he had a son Bor through whom he was the grandfather of Odin, Vili, and Ve.

Bur'ial, the ordinary method of disposing of the dead, a practice which varies among different peoples. Among savage races, and even among some civilized peoples of the East, exposure to wild animals or birds of prey is not uncommon. The careful embalming of the dead by the ancient Egyptians may be regarded as a special form of burial. But by far the most common forms of disposing of the dead have been burning and interring. Among the Greeks and Romans both forms were practised, though among the latter burning became common only in the later times of the republic. In this form of burial the corpse, after being borne in procession through the streets, was

placed upon a pyre built of wood, and profusely sprinkled with oils and perfumes. Fire was set to the wood, and after the process of cremation was complete the bones and ashes were carefully gathered together by the relatives and placed in an urn. With the introduction of the Christian religion, consecrated places were appropriated for the purpose of general burial, and the Roman custom of providing the sepulchre with a stone and inscription was continued by the Christians. The practice of cremation now declined and finally disappeared, but has recently to some extent been revived. See BURYING-PLACES; CREMATION; FUNERAL RITES; MAUSOLEUM; MUMMY; etc.

Buriats, boo-rē-äts', a Mongol people, forming a branch of the Kalmucks, and who submitted to the Russians in 1644. They inhabit the southern part of the government of Irkutsk and Transbaikalia, and number more than 200,000. They support themselves by their flocks, by hunting, and the mechanical arts, particularly the forging of iron. Their dress consists partly of leather. Their religion is partly Lamaism and partly Shamanism; and their idols are sometimes painted on cloth, and sometimes made of wood, metal, felt, and sheepskin.

Buridan, Jean, zhōn bū-rē-dān, French scholastic philosopher: b. Béthune, Artois, about 1300; d. after 1358. He studied at Paris, where he attached himself as a disciple of Occam to the party of the Nominalists, and at a later time became himself a teacher. In the end he was forced by his opponents to flee from Paris, when he betook himself to Vienna, where he is said to have been influential in bringing about the establishment of the university. Here also he wrote some logical and ethical treatises, in which he appears as a zealous adherent of the Aristotelian philosophy. Buridan was a supporter of the doctrine of Determinism (q.v.), and he is now chiefly known through having his name attached to an illustration that he is said to have used in support of his views, and known as "Buridan's Ass." He is said to have supposed the case of a hungry ass placed at an equal distance from two equally attractive bundles of hay, and to have asserted that in the supposed case the ass must inevitably perish from hunger, there being nothing to determine him to prefer the one bundle to the other. This illustration, however, is not found in any of his works, and from its nature it would appear more likely to have been used by the assailants of the doctrine of Determinism. He wrote 'Compendium Logicae' (1489), and other works.

Bu'rin, or **Graver**, the principal instrument used in copper engraving, is made of tempered steel, and is of prismatic form, the graving end being ground off obliquely to a sharp point. The distinctive style of a master is frequently described by such expressions as a soft burin, a graphic burin, a brilliant burin, etc.

Buriti (bu-rī-tē') **Palm**, a lofty, fan-leaved palm (*Mauritia vinifera*), common in swamps in northern Brazil. It bears abundant crops of scaly nuts about two inches long, from the reddish oily pulp of which a confection is made by boiling with sugar. The nuts also yield an oil which is emulsified to make a popular drink. After the tree is felled numerous cup-like holes are made in the prostrate trunk.

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These become filled with a reddish fluid, which is used as a beverage. Its taste resembles some sweet wines.

Burke, Edmund, Irish orator and statesman: b. Dublin, probably 12 Jan. 1729; d. Beaconsfield, England, 9 July 1797. In 1743 he entered Trinity College, Dublin, taking a bachelor's degree, in 1748; and not much is recorded of his life for the next few years. In 1750 he first entered the great theatre of London as a law student at the Middle Temple, but did not study with assiduity and was never called to the bar. He is said to have become the admiration of his intimates, however, for the brilliancy of his parts, and the variety of his acquisitions. Applying himself to literature, he supported himself by his pen, and in 1756 published, without a name, his first work, 'A Vindication of Natural Society, in a Letter to Lord —, by a late Noble Writer.' This exhibited so complete an imitation, although ironical, of the style of Bolingbroke, that many persons were deceived by it, not perceiving Burke's intention to prove that the same arguments with which that nobleman had attacked religion might be applied against all civil and political institutions whatever. In the same year he published his 'Philosophical Inquiry Into the Origin of Our Ideas of the Sublime and Beautiful.' The elegance of its language, and the spirit of philosophical investigation displayed in it, introduced the author to the best literary acquaintance. In 1758 he suggested to Dodsley the plan of the *Annual Register*, and took upon himself the composition of the historical part, which he continued for a number of years. His political career may be said to have commenced in 1761, when he went to Ireland as confidential friend to William Gerard Hamilton, then secretary to the lord-lieutenant, Lord Halifax. On his return to London he joined the club to which Dr. Johnson, Garrick, and Reynolds belonged, all of whom became his intimate friends. In 1765, he was introduced to the Marquis of Rockingham, then first lord of the treasury, who made him his private secretary; and through the same interest entered Parliament as member for Wendover. The marquis also made him a nominal loan, but real gift, of a large sum, which, together with funds otherwise obtained, placed him for a time in easy circumstances, and enabled him to purchase his elegant seat near Beaconsfield. His first speech in Parliament was on the Grenville Stamp Act; and it was at his advice that the Rockingham administration took the middle and undecided course of repealing the act, and passing a law declaratory of the right of Great Britain to tax the American colonies. This ministry was soon dissolved, to make room for a new cabinet, under Pitt. Burke concluded his official labors by his pamphlet entitled 'A Short History of a Short Administration' (1766). In the proceedings against Wilkes he joined the remonstrants against the violation of the rights of election, and in 1770 published 'Thoughts on the Causes of the Present Discontents,' the sentiments of which are consistent with his future doctrines and conduct. He opposed the ministerial measures antecedent and consequent to the American war; and the whole powers of his eloquence were exerted, first to prevent,

and then to heal, the fatal breach between the mother country and her colonies. In 1774 he was chosen member for Bristol, and for the next eight years Fox warmly supported him in his opposition to Lord North's administration. In 1778 he delivered his famous speech against the employment of the Indians in the American war. He subsequently ventured to give offense to his Bristol friends by his support of the Irish petitions for free trade, and for moderating the penal statutes against the Roman Catholics. In 1780 he introduced his famous economical reform bill, which he unsuccessfully advocated with an extraordinary union of wit, humor, and financial detail. Next year, being now member for Malton, he again brought it forward without success. In 1783 Lord North's ministry was dissolved; and on the return of the Marquis of Rockingham and his party to power, Burke obtained the lucrative post of paymaster-general of the forces, and a seat at the council board. He also embraced the auspicious opportunity to reintroduce his reform bill, which passed, but not without considerable modifications. On the death of the Marquis of Rockingham, and the succession of Lord Shelburne, Burke resigned, and joined the coalition. The India Bill formed the ostensible cause for dismissing this ill-judged combination; and Pitt succeeded to the helm, his administration lasting for 17 years. The next great political event in Burke's life was his share in the prosecution of Warren Hastings. His conduct in this affair gained him little in the public estimation, except increased fame as an orator. On the settling of the regency in 1788 he argued against the principle of the ministers, that the regency was elective, and not hereditary. The last great act of his political life was the part he took in the discussions on the French revolution. He early manifested his dislike to it, and in 1790 loudly condemned the principles and conduct of the revolutionists. It was mainly this feeling that made him oppose Fox's bill for the repeal of the Test and Corporation Acts (March 1790). His famous 'Reflections on the Revolution in France' appeared in November of that year; and no work ever attracted more attention, or produced more effect. It exhibits both the merits and defects of the writer, and contains much justness of argument, profundity of observation, and beauty of style; but it is equally obvious that he commits the very fault he intended to reprobate in his 'Vindication of Natural Society' by making his arguments applicable to the defense of all establishments, however tyrannical, and censure of every popular struggle for liberty, whatever the oppression. It had an unprecedented sale, and obtained unbounded praise from all who trembled for establishments, or were alarmed at the character which the French Revolution was beginning to assume. On the other hand, it met with severe and formidable critics and opponents, and, among other things, produced the celebrated 'Rights of Man,' of Thomas Paine, and the 'Vindiciæ Gallicæ,' of Sir James Mackintosh. Burke followed up this attack with a 'Letter to a Member of the National Assembly' (1791); an 'Appeal from the New to the Old Whigs' (1791); 'Letter to a Noble Lord on the Subject in Discussion with the Duke of Bedford' (1796); 'Letters on a Regi-

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cide Peace' (1796-7); etc. In all these productions he displayed unabated powers of mind. In 1792 he published a 'Letter to Sir Hercules Langrishe, on the Propriety of Admitting Roman Catholics to the Elective Franchise.' In 1794, after a nine days' speech against Warren Hastings, he withdrew from Parliament. Amiable in private life, and exemplary in his domestic and social relations, he was greatly beloved by his friends. His conversation was delightful and instructive. He was exceedingly charitable and beneficent, and founded a school for the children of French emigrants, the permanent support of which formed one of his latest cares. His public character will be best collected from a study of his political career, and his powers of mind from his publications. His oratory was pre-eminently that of a full mind, which makes excursions to a vast variety of subjects, connected by the slightest and most evanescent associations, and that in a diction as rich and varied as the matter. In delivery, however, the effect of his speeches was by no means proportioned to their absolute merit; their length, their copiousness, abundance of ornament, and wide field of speculation, producing impatience in men of business absorbed in the particular subject of debate; added to which, his manner was indifferent, his voice harsh, and his action, though forcible, inelegant. On the whole, though the greatest genius, he was by no means the most effective orator in the House of Commons. Consult: Macnight, 'Life and Times of Edmund Burke' (1858-60); Morley, 'Burke in English Men of Letters' (1879); Morley, 'Burke, a Historical Study' (1867).

Burke, John, Irish genealogist: b. near Parsonstown, Ireland, 1786; d. Aix la Chapelle, 27 March 1848. His life was devoted to genealogical research. In 1826 he began to publish a 'Genealogical and Heraldic Dictionary of the Peerage and Baronage of the British Empire' and subsequent works by him were: 'A General and Heraldic Dictionary of the Peerages of England, Ireland, and Scotland—Extinct, Dormant, and in Abeyance' (1831); 'A Genealogical and Heraldic History of the Commoners of Great Britain and Ireland' (1833-8), which in subsequent editions appeared as 'A Dictionary of the Landed Gentry.'

Burke, Sir John Bernard, English herald and genealogist; son of John Burke (1787-1848): b. London, 1815; d. Dublin, 13 Dec. 1892. He was educated at Caen in Normandy, was trained as a lawyer and called to the bar in 1839. Besides editing the successive issues of the 'Peerage' founded by his father (40th ed. 1887), he published other works on the 'Landed Gentry' (1846); 'Extinct Peerages' (1846); 'Anecdotes of the Aristocracy' (1849); 'Family Romance' (1853); 'The Vicissitudes of Great Families' (1859); 'The Rise of Great Families' (1873); 'The Book of Precedence' (1881); and 'Reminiscences' (1882).

Burke, John Masterson, American banker and philanthropist, of Irish parentage: b. New York, 2 July 1812. His early education was obtained at a private school and at the age of 12 he became a clerk in a woolen house in his native city, accepting a position of trust in a steel and iron foundry four years later. While there he studied mechanical engineering and subsequently went to Yucatan as engineer of

a cotton factory there, remaining seven years. Returning to New York, he became some years later the chief member of the firm of Ponvert & Company, sugar and commission merchants. Retiring from this business after 1860 he devoted his attention to railroad interests, becoming director in the Chicago, Milwaukee & St. Paul and other important railways, as well as in several large banking corporations. From boyhood the main purpose of his life has been to devote his savings to philanthropic ends, and in July 1902 he transferred real and personal property to the amount of \$4,000,000 to a corporation, called in honor of his mother, the "Winifred Masterson Burke Relief Foundation." The purpose of the corporation is to be the relief of worthy men and women who, notwithstanding their willingness to support themselves, have become partly or wholly unable to do so by reason of sickness or misfortune, or who have been discharged from hospitals before regaining sufficient strength to resume their regular employments. As the especial design of the founder is to benefit convalescents, provision is made for the establishment of a convalescent home upon part of the real estate conveyed to the trustees in the immediate vicinity of New York. All persons needing rest as a means of cure will be eligible for admission to the convalescent hospital. As far as possible the self-respect of the applicants will be carefully considered. A moderate charge may therefore be made, but in case the patient prefers it shall be regarded as a loan, to be repaid without interest and without security. In formulating this plan it is intended that provision shall be made at the Convalescent Hospital for the reception of sick children, not proper subjects for any existing hospital, but requiring careful attention in order to prevent more serious ailments. It is also intended that provision shall be made for supplying nurses at a moderate cost to families having sick cases requiring special treatment under the supervision of the attending physician.

Burke, Maurice Francis, American clergyman: b. Ireland, 5 May 1845. He came to the United States in childhood and was educated in Chicago and Notre Dame, Ind., and in the American College, Rome, where he was ordained to the Roman Catholic priesthood in 1875. Returning to the United States, he took charge of a parish in Joliet, Ill. In 1887 he was consecrated bishop of Cheyenne, Wyo., and in 1893 was transferred to the see of St. Joseph, Mo. Bishop Burke is known as a fine linguist.

Burke, Robert O'Hara, Australian explorer: b. county Galway, Ireland, 1820; d. Australia, 28 June 1861. After serving in the Austrian army he went to Australia, and after seven years' service as inspector of police was appointed commander of an expedition to cross the continent of Australia from south to north. He and his associate, Wills, reached the tidal waters of the Flinders River, but both perished of starvation on the return journey. They were among the very first white men to cross the Australian continent from south to north.

Burke, Thomas Martin Aloysius, American clergyman: b. Ireland, 10 Jan. 1840. He came in childhood to Utica, N. Y., and was educated in Toronto and Baltimore and was ordained to the Roman Catholic priesthood in

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1864. He was appointed to labor in Albany and became successively vicar-general and administrator. In 1894 he was consecrated bishop of Albany.

Burke, Thomas Nicholas, Irish clergyman and orator: b. Galway, 1830; d. 1883. He was educated in Italy, where he entered the Order of St. Dominic. Going to England, he preached in that country and later in Ireland, gaining a high reputation as an orator and becoming familiarly known as "Father Tom." In 1872 he made a visit to the United States and lectured in reply to Froude, his addresses appearing in print under the title of 'English Misrule in Ireland.'

Burke and Hare, two miscreants, of whom William Burke, a native of Ireland, was detected, tried, and executed at Edinburgh, in 1829, for the murder of numerous individuals, his accomplice, Hare, escaping the hangman by turning king's evidence. At this time the "resurrectionists" were busy at their nefarious trade, but the vigilance with which the burying-grounds throughout the country were watched rendered a supply of subjects for anatomical schools almost impracticable, and the demand for dead bodies consequently became great. This led Burke and Hare to murder, by suffocation, many poor waifs who were decoyed into Hare's lodging-house, and whose bodies they sold to Dr. Robert Knox, proprietor of an anatomical theatre in Edinburgh. The case of Burke and Hare brought home to the public mind more clearly than ever how necessary it is that schools of anatomy should receive a regular supply of subjects for dissection, and in 1832 an act was passed for supplying the anatomical schools throughout the kingdom from the unclaimed dead in the hospitals.

Bürkel, Heinrich, hin'rih бүr'kēl, German painter: b. Pirmasens, 30 March 1813; d. Munich, 10 June 1869. He was educated at Munich and in Italy; he is chiefly a genre painter; his scenes from the Bavarian and Tyrolean Alps were among the first of their kind, and his village and tavern scenes rank among the best in modern art. Among his paintings are 'Scenes in an Inn' and 'Winter Scenes in the Tyrol.'

Bur'kitt, Francis Crawford, English Biblical scholar: b. London, 3 Sept. 1804. He was graduated at Trinity College, Cambridge. He has published 'Early Christianity Outside the Roman Empire' (1899); 'Fragments of Aquila' (1897); 'The Rules of Tyconius' (1894); 'Two Lectures on the Gospels' (1900); etc.

Burleigh, bér'li, George Shepard, American writer, brother of William H. Burleigh (q.v.): b. Plainfield, Conn., 26 March 1821; d. Providence, R. I., July 21, 1903. He has published 'The Maniac and Other Poems'; 'Signal Fires on the Trail of the Pathfinder.'

Burleigh, William Cecil (LORD), English statesman: b. Bourn, Lincolnshire, 13 Sept. 1520; d. London, 4 Aug. 1598. He was secretary of state under Edward VI. and Elizabeth, and prime minister of England for 40 years. In 1588 Parliament was assembled, and, by his advice, a plan of religious reform was laid before it. In this he had a considerable share; and he also took the leading part in the establishment of the Thirty-nine Articles of faith, which form the basis of the reformed religion

of the State. To him is also due the regulation of the coinage, which had been altered since Henry VIII.'s time. He was created Baron Burleigh in 1571, and, in 1588, concluded an advantageous treaty with the Netherlands. His policy was both cautious and comprehensive and he was entirely unaffected by personal prejudices in his management of public affairs. Consult: Nares, 'Memoirs of Lord Burghley' (1828-31); Charlton, 'Life' (1847); Hume, 'Great Lord Burleigh' (1898).

Burleigh, William Henry, American poet: b. Woodstock, Conn., 2 Feb. 1812; d. Brooklyn, N. Y., 18 March 1871. Bred on a farm, at 16 he became apprentice to a clothier, then to a village printer, and continued to labor in various places as journeyman printer, and finally as editor. In the latter capacity he had charge of the 'Literary Journal' at Schenectady, the *Christian Witness*, at Pittsburg, and the *Washington Banner*, in which papers, and in others, he published many short poems. A collection of them was published in 1840.

Burlesque, the comic effect arising from a ludicrous mixture of things high and low. High thoughts, for instance, are clothed in low expressions, or noble subjects described in a familiar manner, or *vice versa*.

Burlingame, Anson, American diplomatist: b. New Berlin, N. Y., 14 Nov. 1822; d. St. Petersburg, Russia, 23 Feb. 1870. After graduating from the Harvard Law School in 1847 he practiced law in Boston, and entering politics was active as a Free Soil advocate in 1848, and in 1854 was sent to Congress as a representative of the American Party. His vigorous denunciation of the assault upon Senator Sumner by Preston Brooks brought him a challenge from the latter, which was accepted, but Brooks declined to travel to the rendezvous in Canada. In 1861 he was sent as minister to Austria but was not received by the Austrian government on account of his advocacy of Hungarian independence. He was minister to China 1861-67, and in the last-named year was appointed ambassador from China to the United States and various European governments. On 4 July 1868 he concluded the noted 'Burlingame Treaty' which gave reciprocal privileges to China and the United States. After concluding treaties between China and Denmark, Sweden, Holland and Prussia, he died while arranging a treaty between China and Russia.

Burlingame, Edward Livermore, an American editor, son of Anson Burlingame (q.v.): b. Boston, 30 May 1848. He studied at Harvard and acted as private secretary to his father, who was United States minister. Since 1879 he has been associated with the publishing house of Charles Scribner's Sons, and in 1886 became editor of 'Scribner's Magazine.'

Burlington, England. See BRIDLINGTON.

Bur'lington, Iowa, a city and county-seat of Des Moines County, on the west bank of the Mississippi River at the intersection of the Chicago, Burlington, and Quincy, and several other lines of railroad. Its industries include the manufacture of machinery, furniture, agricultural tools, flour, linseed oil, soap, and many other articles, and extensive railroad shops are situated here. The city contains among its

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important buildings an opera house, court-house, city hall, hospitals, public library, schools of various kinds, and Burlington Institute College. Crapo Park, containing 100 acres, is in the southern part of the city. Burlington is governed by a mayor, elected biennially and a city council, and was named for Burlington, Vt. Its earliest buildings were built in 1833 and from 1837 to 1840 it was the State capital. Pop. (1900) 23,201.

Burlington, N. J., a city and port of entry in Burlington County, on the Delaware River and the Pennsylvania R.R.; 18 miles northeast of Philadelphia. It is a manufacturing trade centre for surrounding towns, and contains St. Mary's Church, endowed by Queen Anne; St. Mary's Hall, the oldest Church school for girls in the country; the State Masonic Home; Burlington College, and many fine old residences; and has manufactories of shoes, stoves, iron pipe, terra-cotta, and canned goods. The city was settled in 1677, by Friends, under the name of New Beverly. The name was subsequently changed to Bridlington, in honor of the Yorkshire town of that name on the North Sea, commonly called Burlington, and the spelling was presently made to accord with the pronunciation. The city was for many years the seat of government of West Jersey; and was the residence of the last colonial governor, William Franklin. It was bombarded by the British in 1776. Pop. (1900) 7,394.

Burlington, Vt., a city, port of entry and county-seat of Chittenden County, on Lake Champlain and the Central V. and Rutland R.R.'s; 40 miles northwest of Montpelier. It has a very large lake commerce and manufactories of lumber, cotton, and woolen goods, and iron. The environment is agricultural. The city is the seat of the State University of Vermont and of the State Agricultural and Medical colleges; Bishop Hopkins Hall; the Roman Catholic Cathedral; the Fletcher, Billings, and Burlington Law libraries; a county court-house; United States government building, and a Young Men's Christian Association Hall. Burlington is noted for its benevolent and educational institutions, which include the Mary Fletcher Hospital, Home for Aged Women, Home for Friendless Women, Home for Destitute Children, Adams Mission House, Louisa Howard Mission, Providence Orphan Asylum, Cancer Relief Association, Lake View Retreat, several sanitariums, the Vermont Episcopal Institute, St. Joseph's and St. Mary's academies (Roman Catholic), and high and graded schools. The city was settled in 1773; was a garrisoned post during the War of 1812; and was incorporated in 1865. Its material development has been largely due to its great lumbering industries. The famous Col. Ethan Allen is buried beneath a handsome monument in Greenmount Cemetery. Pop. (1900) 18,640.

Burlington Limestone, a limestone of Carboniferous age, named for its occurrence near Burlington, Iowa. It is also found in other parts of the Mississippi valley. This limestone is marked by the presence of abundant fossil crinoids and corals. It has important industrial value.

Bur'ma, the largest province of British India. It is on the east side of the Bay of Bengal, and at one time formed the greater portion of a

native kingdom or empire, which is said to have extended from lat. 9° to 26° N., and from lon. 92° to 104° E., its greatest length being about 1,000 miles, and its breadth 600; its area being then about 270,000 English square miles. But in 1826 the provinces or divisions of Arracan and Tenasserim were wrested from it by the British, and in 1852 Pegu and the province of Martaban shared the same fate. This portion was then known as British Burma, and continued to be so till in 1886 the rest of the kingdom was annexed by Great Britain, when the two portions came to be designated Upper and Lower Burma respectively. They now form together one province under a lieutenant-governor and legislative council. The area of Lower Burma is 87,957 square miles. It is to a large extent mountainous in character, the only extensive level being in Pegu, where the valleys of the Irrawadi and Sittaung form an alluvial tract of about 10,000 square miles. The rainfall varies from less than 60 inches in some places to 190 or more in others. About half the soil is believed to be cultivatable, but a comparatively small portion is as yet under cultivation, though agriculture is extending year by year. Since the occupation of the country by the British it has rapidly increased in prosperity, and the revenue is generally greater than the expenditure. The imports and exports together exceed \$50,000,000, the bulk of the trade being with Great Britain. The capital and principal port is Rangoon. Other towns are Moulmein, Akyab, and Bassein. Upper Burma has an area of 83,473 square miles, and is on the whole similar in character to Lower Burma, but less productive, and has generally a smaller rainfall. It is rich in minerals, including gold, silver, precious stones, marble, iron, lead, tin, antimony, arsenic, sulphur, and petroleum. Only a few of these are worked. The chief precious stones are the ruby and the sapphire; amber and jade are also found. All precious stones used to be sent to the royal treasury and strangers were prohibited from approaching the places where they were found. These districts are still the subject of special regulation under the British rule. The whole country is intersected by numerous streams, which, following the direction of the chief mountain chains, flow generally south to the Indian Ocean. The chief of these are the Irrawadi, the Salween, and the Chindwin, which joins the Irrawadi, the combined stream being of great volume. The Irrawadi is of great value as a highway of communication and traffic, being navigable beyond Bhamo, near the Chinese frontier. In their upper courses the rivers flow through narrow valleys; in their lower courses they traverse low-lying districts, and in the rainy season often overflow their banks. Among the wild animals of the country are the elephant, rhinoceros, tiger, leopard, deer of various kinds, and the wild hog. The rivers abound with fish. Of domestic animals we may mention the ox, buffalo, horse, elephant, and cat. In the southern districts, owing to the numerous rivers, the soil is most productive. Here grow rice, sugar cane, tobacco, cotton, indigo, and all the tropical fruits. Tea is cultivated in many of the more elevated parts. The forests produce timber of many sorts, including teak. A great part of the trade of the country is carried on by means of the Irrawadi River. From Bhamo

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goods are conveyed to China, and this branch of trade is believed to be capable of great development. Rice is the great crop (occupying about 80 per cent of the cultivated area), and this grain forms the chief export, others being teak, cotton, and silk stuffs, petroleum, saltpetre, paper, and lacquer ware. Railways have been introduced, and the number of miles open is now about 1,000. From Rangoon two lines proceed north, one along the left bank of the Irrawadi to Prome and Meaday, the other through the Sittaung valley to Mandalay, and from that on the other side of the Irrawadi to Bhamo and Mogaung.

The Burmese have many skilful weavers, smiths, sculptors, workers in gold and silver, joiners, etc. Among industrial establishments are rice-mills, saw-mills, a few works for iron goods, ship-building yards, cutch works, etc. Other industries include boat-building, weaving, pottery, lacquerwork, and brasswork. The weaving of cotton and silk goods is carried on by the women everywhere. The pottery of the country is strong and durable, if not especially artistic; and the gold and silver work finds numerous purchasers outside the country. Wood-carving is extensively practised for the adornment of houses, boats, etc. The native vessels plying on the Irrawadi and other rivers are often of 100 to 150 tons burden, while thousands of small craft are engaged in trade or fishing. Large numbers of good cigars are made by women, and are partly used in the country, partly exported. The buildings among the Burmese are very slight, as the government used to require them to be chiefly of wood or bamboo, and prohibited the use of stone or brick except for pagodas, and other important structures.

People.—The Burmese are divided into several tribes, and belong to the common Indo-Chinese stock. Among the tribes other than the Burmese proper are the Karens, Kakhyens, Shams, etc. The Burmese proper are of a brown color, with lank, black hair, and vigorous, well-proportioned frames. No Burmese can have more than one wife; but he may have as many mistresses as he will. The latter live in the same house with the wife, and are her servants. The Burmese women enjoy a good deal of freedom; are not shut up as in some parts of the East, and can even engage in a lawsuit in their own name. The chief amusement of the Burmese is their theatre, where declamation, dancing, and music are given by turns. The new year (which begins in April) is celebrated with what is known as the "water feast," when young men and women throw water on each other and the passers-by. The Burmese usually write on palm leaves with an iron style or on black tablets with a pencil; the rich have libraries, with books, the leaves of some of which are thin pieces of ivory, with gilt edges. Their materia medica is chiefly confined to herbs, spices, and mercury; with vaccination they have long been acquainted. The language is monosyllabic, like Chinese, and written with an alphabet (derived from India), the characters of which are more or less circular. Among the common people the principal part of the male dress consists of a double piece of cloth about five yards long, loosely wrapped about the body. Over this a frock is worn, with sleeves open in

front, and reaching below the knees. The lower classes of women wear only a single garment, resembling a sheet, wrapped round the body and fastened under the arms. Men of rank wear a long robe of flowered velvet or satin, with open sleeves and collar, a mantle or scarf being thrown over this. On the head is worn a high velvet or silk cap, plain or embroidered, according to rank. The men wear earrings, often of large size. Women of the higher classes generally wear a shift which reaches only to the pit of the stomach, where it is drawn tight and fastened by strings. This is covered by a loose jacket, with tight sleeves. A piece of silk or cloth encircles the waist and descends to the feet. When a woman wishes to be particularly fine she stains her nails and palms a red color, and tinges her teeth and the edges of her eyelids with black. Both sexes wear the hair long; the men tying it in a knot on the crown of the head, the women on the back. Sandals are often worn, but neither boots, shoes, nor stockings; every man, woman, and child, however, carries an umbrella. The chewing of betel and smoking of tobacco are universal. The Kakhyens or Singfo are a courageous people inhabiting the upper basin of the Irrawadi above Bhamo. They practise a sort of nature worship, and are active as traders, though at present rather lawless. Their villages are ruled by hereditary chiefs. The Chinese from Yunnan have of late years settled in considerable numbers as traders and agriculturists in the Kakhyen country; and in Lower Burma they are now a highly important element in the population as traders and otherwise. In the hilly districts of Tenasserin and Pegu we find the Karens, a somewhat secluded people, less intelligent and more ignorant than the Burmese, and not so purely Mongolian in physical character. The Talains or Mons of the Irrawadi delta resemble the Burmese, but speak a distinct language. The Shans are a numerous people closely allied to the Siamese, and inhabiting eastern and northeastern Burma, together with portions of the neighboring countries.

The native government was an absolute monarchy, the king having unlimited power over life and property. The seat of government, after oscillating between Ava and Amarapura, was latterly fixed in Mandalay, a new town founded in 1857, and situated in a dusty plain a little over two miles from the left bank of the Irrawadi, and about 28 miles northwest from Amarapura. The king was assisted in governing by a council of state known as the *Hloot-daw*, to which belonged at once the functions of a legislature, a cabinet, and a supreme court of justice. It was composed of officials of 14 grades, the president being the king himself, some other member of the royal family, or the prime minister. The king had power to punish at his pleasure anyone, including even the great officers of state. The public revenue was derived from taxes levied in a very irregular and capricious manner, and as the officials received no fixed salary corruption and oppression were extremely prevalent. The criminal laws were barbarously severe. Capital punishment was commonly inflicted by decapitation, but crucifixion and disemboweling were also practised. Torture might be applied to principals or witnesses; and trial by ordeal was not unknown. The

INDO-CHINA, BURMA, SIAM, AND STRAITS SETTLEMENTS.

Chief Capitals: ● Secondary Capitals: ●
Railroads in Operation: — Proposed or under Construction: - - -

ENGLISH STATUTE MILES.
0 50 100 200 300

KILOMETERS.
0 50 100 200 300 400

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standing army was small. Levies were made, in case of war, by way of conscription; and a specified number of houses was required to furnish a soldier or pay a fine. The religion of the country is that of Buddha, which is said to exist here in great purity. The tutelary divinities worshipped in various Buddhist countries are unknown, and the vows of poverty and chastity taken by the monks are said to be less frequently broken here than elsewhere. The Burmese possess a complete system of education, so far as male children are concerned. All boys are required to reside in a religious house for three years, and there they act as servants to the priests, who instruct them in reading, writing, and arithmetic, as well as the doctrines of their religion. The census of 1901 returned a population of 9,184,121, of whom 88.6 per cent were Buddhists, the density per square mile being 55, against 184 for India. Upward of 90 per cent of the population dwell in rural areas, and no tendency toward gravitation to the towns is observed. Although population has been steadily increasing in Burma the fact that an enormous tract of country not previously enumerated was now included in the census operations renders any comparison with the figures of 1891 misleading. Within Burma proper, however, an increase of over 19 per cent is found to have occurred, and a birth-rate of over 38 per mile compares not unfavorably with average European standards. Notwithstanding the fact that the social position of women is so assured in Burma and that there is no suspicion of the existence of female infanticide, women number only 962 in 1,000, against 1,006 and 1,022 in Bengal and Madras. But the explanation probably lies in the preponderance of the male element among the numerous immigrants into the province. Marriage in Burma is a purely secular ceremony, and elementary education is far more widely dispersed than in India, one individual in five being able to read and write.

History.—The Burmese empire is of little note in ancient or general history. Buddhism and civilization are said to have been introduced from India. The last native dynasty was founded by a Burmese called Alompra, a man of obscure birth, who defeated the Peguans, and in 1753 obtained possession of Ava. Having made himself master of Burma, he invaded Siam; but, during this invasion he died suddenly in 1760. Alompra ruled well and wisely, and Namdogee, his eldest son and successor, who died in 1764, inheriting his father's spirit, introduced various reforms and useful measures. Shembuan (Tshen-bo-yen), the emperor's brother, became regent as guardian for his nephew Momien; but he usurped the throne himself and conquered Siam. In 1771, however, Siam recovered its independence, while the principal part of the Burmese forces were engaged in a war with China. In this war they were victorious, and compelled the Chinese whom they took prisoners to intermarry with Burmese females, and to remain in their territory. In 1776 Shembuan left his empire, much enlarged, to his son, Chenguza. This prince lived in the unrestrained indulgence of every appetite till in 1782 he was dethroned and put to death. In consequence of the revolution, Mentaragi, the fourth son of Alompra,

ascended the throne. He ordered his nephew, Momien, who was a state prisoner, to be drowned, and in 1783 subdued the kingdom of Arracan. He then engaged in a war with Siam, which continued till 1793, when peace was made on certain conditions. About this period, it happened that some robbers fled from the Burmese empire, and took refuge in the territory of the East India Company. The Burmese demanded that they should be delivered up, and on their demands not being immediately complied with, marched with a strong force into the offending country. At the same time they carried on a friendly negotiation with the government in Calcutta, which resulted in the surrender of the criminals, and the conclusion of a treaty of amity and commerce between the two governments, negotiated by Capt. Symes. The last victory of the Burmese was in 1822 over the province of Assam. The party driven from Assam, together with the Burmese rebels, fled to the British territories, whence they intended to invade Burma. The British government disarmed the insurgents, but refused to deliver them up or to drive them from the island of Shapuri, which they had occupied. At length the Burmese sovereign demanded of the government at Calcutta the cession of northern Bengal as being a part of Ava, and in January 1824 his forces marched into Cachar, which was under British protection. Lord Amherst, as governor-general of the British East Indies, now declared war against Burma, and Gen. Archibald Campbell prosecuted it so successfully that after the victory at Prome (1-3 Dec. 1825), he obliged the monarch to conclude a peace at Palanagh in 1825. As the treaty was not ratified on the part of the Burmese emperor by the time specified (18 Jan. 1826), Campbell renewed the war and stormed the fortress of Munnun. On 24 February the peace was ratified, and the war concluded with the cession of Arracan, Mergui, Tavoy, etc. In 1852 a second war broke out at the conclusion of which Rangoon and the whole of Pegu fell into the hands of the British. About 1860 the new city Mandalay supplanted Amarapura as the capital. In 1867 British steamers were permitted by treaty to navigate Burmese rivers, and not long after traffic was carried on up the Irrawadi as far as Bhamo. In 1885 the outrageous proceedings of King Theebaw provoked another war, and a British force proceeded from Rangoon up the Irrawadi River, took Mandalay, and sent King Theebaw a prisoner to Rangoon. On 1 Jan. 1886, Theebaw's dominions were annexed to the British empire by proclamation of the viceroy of India (the Earl of Dufferin). After the annexation there was a considerable amount of scattered fighting with dacoits and others, but the country is now comparatively quiet, is being opened up to commerce, and is rapidly advancing in prosperity. In 1897 Burma was constituted a province, and placed under a lieutenant-governor instead of a chief-commissioner.

Bibliography.—Spearman, 'British-Burma Gazetteer' (1880); Mason, 'Burma: Its People and Productions' (1882-3); Phayre, 'History of Burma' (1883); Geary, 'Burma After the Conquest' (1886); Smeaton, 'The Loyal Karen of Burma' (1886); Yoe, 'The Burman, His Life and Notions' (2d ed. 1896); Bird, 'Wanderings in Burma' (1897); Hart, 'Pic-

turesque Burma, Past and Present' (1897); Ferrar, 'Burma' (1898); Harmer, 'The Story of Burma' (1901).

Burmeister, Hermann, hër'män boor'mister, German scientific writer: b. Stralsund, 15 Jan. 1807; d. Buenos Ayres, Argentina, 2 May 1892. He distinguished himself as a geologist and zoologist in his native country, and settled permanently in Argentina, where he continued his investigations. 'Manual of Entomology'; 'History of Creation' (1843); and 'The Fossils of Horses Found Among the South American Pampas' (1875), are among his books.

Burmeister, Richard, German-American musical composer: b. Hamburg, Germany, 7 Dec. 1860. He received an academical education in Hamburg; studied with Franz Liszt, and in Rome, Budapest, and Weimar; made concert tours in Europe in 1883-5 and in the winter of 1893; was at the head of the piano department of Peabody Institute, Baltimore, Md., 1885-97; and settled in New York in the latter year. He made concert tours all over the United States and was director of the Scharwenka Conservatory, New York, in 1897-9. He has composed 'The Sisters' (a dramatic tone poem), numerous songs, and piano, violin, and orchestra pieces; and arranged Liszt's 'Concerto Pathétique,' originally for two pianos, for the piano and orchestra.

Burnaby, Frederick Gustavus, English soldier and traveler: b. Bedford, England, 3 March 1842; d. 17 Jan. 1885. He was educated at Bedford and Harrow, and entered the Royal Horse Guards in his 18th year as cornet. In 1861 he became lieutenant, in 1866 captain, major in 1870, lieutenant-colonel in 1880, and finally, in 1881, was appointed colonel, a rank which he held till his death. In 1875 he made his famous ride to Khiva—a journey that presented great difficulties. During the ride, which he undertook partly because he had learned that the Russian government kept Europeans out of central Asia, he suffered severely from the intense cold prevailing at the time when he crossed the steppes. In 1876 he rode through Asiatic Turkey and Persia. Of both these journeys he published narratives, namely, 'Ride to Khiva' (1876, 11th ed. 1877, new ed. 1884), and 'On Horseback Through Asia Minor' (1877). While serving as lieutenant-colonel of the Royal Horse Guards in the Egyptian campaign, he was killed at the battle of Abu-Klea.

Burnand, Sir Francis Cowley, English author: b. 29 Nov. 1830. He was educated at Eton and Trinity College, Cambridge, and at first studied with a view to entering the Church of England, but when in 1858 he became a Roman Catholic he devoted himself to legal studies, and was called to the bar in 1862. By that year he had already achieved some success as a writer, and in consequence he seldom practised. After about a year's connection with 'Fun' he joined the staff of 'Punch' in 1863, becoming editor in 1880. His book, 'Happy Thoughts,' republished from 'Punch,' achieved considerable popularity, and went through several editions, and was followed by 'More Happy Thoughts' (1871); 'Happy Thought Hall' (1872); 'Quito at Home' (1890). Other successful productions of his

are the extravaganzas, 'New Light on Darkest Africa,' and 'Ride to Khiva' (making fun out of H. M. Stanley and Col. Burnaby respectively), the parody on Ouida's novel, 'Strathmore,' which he published under the title of 'Strapmore,' and 'The Modern Sandford and Merton.' Numerous plays have come from his pen, mostly of the nature of burlesques and light comedies, such as the plays 'Black-eyed Susan' (a burlesque of Douglas Jerrold's drama), and 'The Colonel.' In 1879 he issued a history of the Amateur Dramatic Club, which he had founded at Cambridge University. He collaborated with Sir A. Sullivan in the light operas 'The Chieftain,' produced in 1894, and 'Contrabandista.'

Burnap, George Washington, American Unitarian clergyman: b. Merrimack, N. H., 1802; d. 1859. He was graduated at Harvard College in 1824, and in 1827 he was ordained pastor of the First Independent Church in Baltimore, where he remained until his death. He was a voluminous writer, his publications being chiefly of a theological and controversial character. They include a doctrinal work on the 'Controversy Between Unitarians and Other Denominations of Christians' (1835); 'Lectures to Young Men'; 'Lectures on the Sphere and Duties of Woman'; 'Lectures on the History of Christianity'; 'Expository Lectures on the Principal Texts of the Bible Which Relate to the Doctrine of the Trinity'; and various other works of theology, as well as numerous occasional addresses.

Burne-Jones, Sir Edward, English painter: b. Birmingham, 28 Aug. 1833; d. London, 17 June, 1898. In 1852 he went to Exeter College, Oxford, where he was a fellow student of William Morris, and afterward became acquainted with A. C. Swinburne (who dedicated his 'Poems and Ballads' to him). His first intention was to enter the Church of England, and it was not till he had reached his 22d year that he seriously devoted himself to art studies; but, going to London in 1855, he came under the influence of D. G. Rossetti and the Pre-Raphaelite movement, and soon attained considerable success in various departments of artistic work. In 1859 he set out on a journey through Italy in order to see the productions of the early Italian painters and sculptors, and on his return to England he gave in his stained-glass designs and his pictures splendid promise of his subsequent triumphs. In 1865 he began a series of illustrations to Morris' 'Earthly Paradise,' and he also executed some 70 designs for the 'Story of Cupid and Psyche,' besides pictures dealing with the same subject. He was elected a member of the Old Society of Painters in Water Colors in 1864, but withdrew from it in 1870, and from this year till 1877 scarcely ever exhibited in London. In the Grosvenor Gallery exhibition of the latter year, however, his works formed the chief attraction. He received the Cross of the Legion of Honor in 1880, was elected in 1885 Associate of the Royal Academy, a position which he resigned in 1893 (having only exhibited one picture at the Academy, 'The Depths of the Sea'), and he was created a baronet in 1894. His most important pictures are 'Day, Night'; 'Spring, Summer, Autumn, Winter' (1867-8); 'The Wine of Circe' (1869); 'Chant d'Amour' (1873); 'Be-



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The Prioress's Tale

guiling of Merlin' (1877), an illustration of Tennyson's 'Merlin and Vivien'; 'Six Days of Creation' (1877); 'The Golden Stairs' (1880); 'The Wheel of Fortune' (1883); 'Wood Nymph'; 'King Cophetua' (1884); 'Laus Veneris'; 'The Depths of the Sea' (1886); and 'The Briar Rose' series (1890). He holds a specially high place as a designer for stained-glass windows, and in many other departments of decorative art. His leading characteristics as a painter are his fertile imagination and fine poetic feeling, qualities which no painter of the century has possessed in anything like the same degree. The Old-World dreaminess of his work is finely aided by his wonderful power as a colorist. In common with his friends, Morris and Rossetti, he exercised a most potent influence on Victorian art. See Bell, 'Edward Burne-Jones' (1902).

Burnes, Sir Alexander, Scottish soldier and traveler: b. Montrose, 1805; d. Cabul, 2 Nov. 1841. Having obtained a cadetship, he joined the Bombay native infantry in 1821. Here his proficiency in Hindustani and Persian procured him two regimental appointments as interpreter, and contributed greatly to his future promotion. In 1830 he was appointed to proceed to Lahore, ostensibly for the purpose of delivering a present of horses from the king of England to Runjeet Singh, but really for the purpose of acquainting himself with the lower Indus, with the view of opening it up to commercial enterprise. On returning from this mission, which he successfully accomplished, he proposed a mission into central Asia, and having obtained the sanction of the government, set out in January 1832, descended the Sutlej to Lahore, and proceeded thereafter to Peshawur, Cabul, and Bokhara. He afterward traveled with a caravan across the desert of Merv, visited the shah of Persia in his capital of Teheran, traveled southward to the Persian Gulf, and reached Bombay after a year's absence. He published an account of this journey in 1834, under the title of 'Travels into Bokhara.' He was afterward sent to England as the bearer of his own despatches, received the special thanks of the court of directors, and was presented with the gold medal of the Royal and the silver medal of the French Geographical Society. He returned to India in 1835, and in the following year was sent on a commercial mission to Cabul. While there he discovered that Russia was intriguing to detach the emir, Dost Mohammed, from the British alliance, and on finding the emir disposed to be friendly to Great Britain, he urged Lord Auckland to come to terms with him. His advice was, however, rejected, and a force was dispatched in 1839 to reinstate Shah Sujah on the throne. Burnes accompanied the force as second political officer, and received the honor of knighthood. On the breaking out of an insurrection in Cabul, he was murdered with his brother and several other Europeans.

Burnet, Gilbert, British prelate and historian: b. Edinburgh, 18 Sept. 1643; d. London, 15 March 1715. Having graduated at Marischal College, Aberdeen, he zealously devoted himself to the study of law and divinity. In 1661 he qualified as a probationer in the Church, and traveled into Holland in 1664. On his return he was made Fellow of the Royal Society in London, and ordained to the living of Sal-

toun, Haddingtonshire, in 1665. In 1669 he was made a professor of divinity at Glasgow, where he published his 'Modest and Free Conference Between a Conformist and a Nonconformist,' and wrote his 'Memoirs of the Dukes of Hamilton' (1676); and was offered a Scottish bishopric, which he refused. His 'Vindication of the Authority, Constitution, and Laws of the Church and State of Scotland,' in which he maintains the cause of Episcopacy, was much approved of at court, and several bishoprics were successively offered him and refused. In 1673 he was made chaplain in ordinary to the king, and was in high credit both with Charles and the Duke of York. Removing to London he received the appointment of chaplain to the Rolls Chapel in 1675, and shortly afterward the lectureship at St. Clement's. The nation being alarmed on account of the progress of Catholicism, Burnet undertook a 'History of the Reformation in England.' He gave a first volume to the public in 1679, when the affair of the popish plot was in agitation. It procured for the author the unprecedented honor of thanks from both houses of Parliament. The second appeared in 1681; the third, which was supplementary, in 1714. The high character of Burnet as a divine caused him to be sent for by the witty and profligate Earl of Rochester, when, exhausted by a course of libertinism, he was sinking into the grave. The result of his conferences with the dying nobleman he gave to the world in his celebrated 'Account of the Life and Death of the Earl of Rochester.' About this time he wrote a letter to the king censuring his public misgovernment and private vices. His connection with the opposition party was now very intimate, and he attended Lord William Russell to the scaffold, when executed for his share in the Rye House plot. He published during this period several works in favor of liberty and Protestantism, and wrote the lives of Bishop Bedell and Sir Matthew Hale (1682); and in 1683 made his translation of More's 'Utopia.' On the accession of James he made a tour in France and Italy, and in 1687 he published an account of his travels in a series of letters to Robert Boyle. When at Utrecht he was invited to The Hague by the Prince and Princess of Orange, and had a great share in the councils relative to Britain. James caused a prosecution for high treason to be commenced against him in Scotland, and demanded his person from the states, who refused to deliver him up. In the revolution he took an active part, accompanying the Prince of Orange to England as chaplain, and was rewarded for his services by the bishopric of Salisbury. On taking his seat in the House of Lords, he displayed his usual moderation in regard to the non-juring clergy and dissenters. As a prelate, Bishop Burnet distinguished himself by fervor, assiduity, tolerance, and charity. In 1699 he published his 'Exposition of the Thirty-nine Articles.' The scheme for the augmentation of poor livings out of the first-fruits and tenths due to the Crown, known as Queen Anne's Bounty, originated with Burnet. He left behind him in manuscript his well-known 'History of His Own Times' (1723-34), upon which the best judgment to-day is that nothing could be more admirable than his general candor, his accuracy as to facts, the fullness of his information, and the

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justice of his judgments both of those whom he vehemently opposed and of those whom he greatly admired. The value of the work, says a recent authority, "as a candid narrative and an invaluable work of reference, has continually risen as investigations into original materials have proceeded."

Burnet, Jacob, American jurist: b. Newark, N. J., 22 Feb. 1770; d. Cincinnati, Ohio, 10 May 1853. Admitted to the bar in 1796, he removed to Cincinnati, then a village with about 500 inhabitants, and was a member of the territorial government from 1799 till the establishment of a State government in 1803. In 1821 he was appointed judge of the supreme court of Ohio, and was elected United States senator in 1828. Burnet was elected a member of the French Academy of Sciences upon the recommendation of Lafayette, and published in 1847 a volume of 'Notes on the Northwestern Territory.' He was prominent in civic enterprises in Cincinnati for over half a century, assisting to establish the Lancasterian Academy; helping to found the Cincinnati College, whose first president he was; besides being president of the Ohio Medical College, and the Cincinnati Colonization Society.

Burnet, John, Scottish engraver, painter and art-critic: b. Fisher-row, near Edinburgh. 20 March 1784; d. 1868. He learned etching and engraving, and with Sir William Allan and Sir David Wilkie, was a student in drawing and painting at the Trustees' Academy, Edinburgh. In 1806 he went to London, where he engraved Wilkie's 'Jew's Harp'; 'Blind Fiddler'; 'Rent Day'; 'Rabbit on the Wall'; 'Chelsea Pensioners Reading the Gazette of the Battle of Waterloo' (his largest and most elaborate work); 'Letter of Introduction'; 'Death of Tippoo Saib'; and 'Village School.' He also engraved plates from several recent painters, from the Rembrandts in the National Gallery, and from several of his own paintings. He published 'Practical Treatise on Painting' (1827); 'Rembrandt and His Works' (1849); 'Life and Works of J. W. M. Turner,' with Cunningham (1852).

Burnet, Thomas, English divine and philosopher: b. Croft, Yorkshire, about 1635; d. London, 27 Sept. 1715. He was educated under Dr. Ralph Cudworth at Cambridge, and afterward traveled as tutor to several young noblemen. In 1681 he made himself known by his 'Telluris Theoria Sacra,' which he subsequently translated into English. In 1685 he became master of the Charter-house, and after the revolution of 1688 was appointed chaplain in ordinary and clerk of the closet to King William. In 1692 he published 'Archæologia Philosophica, sive Doctrina antiqua de Rerum Originibus,' but the freedom of opinion displayed in this work led to the removal of the author from the clerkship of the royal closet. Two posthumous works of this author appeared in 1727—the treatises 'De Fide et Officiis Christianorum'; 'De Statu Mortuorum et Resurgentium.' All the works of Burnet exhibit him as an ingenious speculator, rather than as a patient and sober inquirer concerning the moral and natural phenomena of which he treats. His great work, the 'Theory of the Earth,' is one of the many systems of cosmogony in which Christian philosophers have attempted to reconcile the Mo-

saic account of the creation, paradise, and the deluge, with the traditions of the ancients and the principles of modern science. His speculations are recommended by sublimity of description and eloquence of style. In his 'Archæologia Philosophica' he has combated the literal interpretation of the history of the fall of man; and to expose its improbability he has introduced an imaginary dialogue between Eve and the serpent, which, as coming from the pen of a divine, is singular enough. It is only to be found in the first edition of the work.

Burnet, William, American colonial governor: b. The Hague, Holland, 1688; d. 1729. He was a son of Gilbert Burnet (q.v.) and was appointed governor of New York and New Jersey in 1720. Two years later he founded at Oswego the earliest English trading post on the Great Lakes as the first step in his able Indian policy in New York which accomplished very much for the interests of the mother country and the colonies. In 1728 he was transferred to the governorship of Massachusetts and New Hampshire and was speedily involved in disputes with the Assembly of the former colony over the question of salary.

Burnet, the popular name of two genera of plants, both of which belong to the natural order *Rosaceæ*. (1) Garden Burnet (*Poterium sanguisorba*), a perennial plant which grows to the height of about two feet; leaves smooth, alternate, imparipinnate, composed of serrate leaflets; flowers arranged in rounded heads of a purplish color, with the female flowers above and the male flowers below. It is found wild in sunny places among rocks and in open fields, from New York to Maryland. It is cultivated in kitchen gardens for its aromatic leaves, which are used to season salads. It is also an excellent food for cattle. (2) Canadian Burnet (*P. canadense*) is also a perennial plant; calyx in four divisions; stamens, four. Its stem is straight, from three to six feet in height; leaflets ovate, smooth. This plant grows chiefly in bogs and wet places from Newfoundland to Georgia, and west to Michigan.

Burnet Moth, the name for the genus of hawkmoths, called *Anthrocera*, or, by some *Zygana*. *Anthrocera filipendula* is the six-spot burnet moth. The six spots, which are on the superior wings, are red, while the rest of the wings are green. Its caterpillar, which feeds on the plantain, trefoil, dandelion, etc., is yellow, spotted with black. *A. loti* is the five-spot burnet moth. It is less common. The caterpillar feeds on honeysuckle, bird's foot, trefoil, etc.

Burnett', Frances Eliza Hodgson, Anglo-American novelist: b. Manchester, England, 24 Nov. 1849. In 1865 she went to Tennessee with her parents, and there married in 1873 Dr. S. M. Burnett. Divorced from him in 1898 she married in 1900 Stephen Townsend, an English writer. Her first conspicuous literary success was 'That Lass o' Lowrie's,' a story of collier life in her native county, which appeared originally in 'Scribner's Magazine,' and in book form in 1877. Her other works, which usually appeared first in serial form, include 'Theo, a Love Story' (1877); 'Kathleen Mavourneen' (1879); 'Haworth's, a Novel' (1879); 'Louisiana' (1880); 'A Fair Barbarian' (1881); 'Es-

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meralda,' a play (1881); 'Through One Administration' (1883); 'Little Lord Fauntleroy,' a story of child-life, which has had very great success both as novel and as drama (1886); 'Sara Crewe' (1888); 'Little Saint Elizabeth' (1889); 'Two Little Pilgrims' Progress' (1895); 'A Lady of Quality' (1896); 'His Grace of Ormonde' (1897); 'The Captain's Youngest' (1898); 'In Connection with the De Willoughby Claim' (1899); 'The Making of a Marchioness' (1901); 'The Little Unfair Princess' (1903). Mrs. Burnett's work shows great versatility in the creation of character, and has but little of the sensational element.

Burnett, James (LORD MONBODDO), Scottish judge: b. at the family seat of Monboddo, in Kincardineshire, 1714; d. Edinburgh, 26 May 1799. After studying at Aberdeen and Edinburgh he went to the University of Groningen, whence he returned in 1737, and commenced practice as an advocate at the Scottish bar. In 1767 he was raised to the bench on the decease of his relative, Lord Milton. He distinguished himself by his writings as a metaphysician, having published a work on the 'Origin and Progress of Language' (1773-92), and 'Ancient Metaphysics' (1779-99, six volumes). Lord Monboddo was an enthusiastic admirer of ancient literature, and especially of the works of Plato and other Grecian philosophers. His works contain many interesting observations, but also exhibit some strange and paradoxical opinions. Thus he seriously advocates the existence of satyrs and mermaids, and has advanced some whimsical speculations relative to the affinity between the human race and the monkey tribe, which exposed him to a good deal of ridicule on the first publication of his theories. Both his official and his private character were extremely respectable; and he was, notwithstanding some eccentricities, a man of learning and ability.

Burnett, Peter Hardeman, American pioneer and writer: b. Tennessee, 1807; d. 1895. In early life he removed to Missouri and thence to Oregon, where he assisted in establishing a territorial government and sat for two terms in the legislature. He was one of the first of the gold hunters in California in 1848, and actively advocated organization of civil government without delaying for action of Congress. When the new constitution was adopted he was elected governor, resigning in 1851. He was judge of the supreme court, 1857-8, and president of the Pacific Bank of San Francisco, 1863-80. He published 'The Path Which Led a Protestant Lawyer to the Catholic Church' (1860); 'The American Theory of Government Considered with Reference to the Present Crisis' (1861); 'Recollections of an Old Pioneer' (1878); 'Reasons Why We Should Believe in God, Love God, and Obey God' (1884).

Burnett Prizes, two prizes established by John Burnett, merchant of Aberdeen, on his death in 1784. He left a fund from which were to be given every 40 years two theological prizes (not less than \$6,000 and \$2,000) for the best two essays in favor of the evidence that there is an all-powerful, wise, and good Being, and this independent of all revelation. The first competition was in 1815, when Dr. Brown, prin-

cipal of Aberdeen University, gained the first prize, and Dr. John Bird Sumner, afterward archbishop of Canterbury, the second. In 1855 the first prize was adjudged to the Rev. R. A. Thompson, Lincolnshire, and the second prize to the Rev. Dr. John Tulloch, afterward principal of St. Mary's College, St. Andrews. The destination of the fund was applied by Parliament in 1883 to the establishment of a lectureship on natural theology in the University of Aberdeen.

Burney, Charles, English composer and writer on music: b. Shrewsbury, 12 April 1726; d. Chelsea, London, 12 April 1814. He studied music under the organist of Chester Cathedral there, and at Shrewsbury, under the direction of his half-brother, an organist, and afterward in London between 1744 and 1747, under Dr. Arne. In 1751 he obtained the place of organist at Saint Margaret's Church, Lynn Regis, in Norfolk. Here he commenced his 'General History of Music.' In 1760 he returned to London, where his compositions and the musical skill of his eldest daughter, then eight years of age, excited admiration. In 1760 he took the degree of doctor of music at Oxford. In 1770 he visited France and Italy, and two years afterward, the Netherlands and Germany, for the sake of his great work. He published accounts of both tours. After his second return he became a Fellow of the Royal Society. In 1776 appeared the first volume of his 'General History of Music from the Earliest Ages to the Present Period' (4to), the second in 1782, and the third and fourth in 1789. He was the author of several other valuable works, among which are the 'Memoir of Handel,' and a 'Life of Metastasio.' He died in the office of organist at Chelsea Hospital, and in receipt of a pension of \$1,500. He wrote most of the musical articles in Rees' Cyclopaedia. His second daughter, Frances or Fanny (Madame d'Arblay, q.v.), well known as an authoress, published a memoir of her father.

Burney, Charles, English classical scholar and critic, son of Charles Burney (1726-1814, q.v.): b. Lynn, Norfolk, 4 Dec. 1757; d. 28 Dec. 1817. He received his education at the Charter-house School, at Caius College, Cambridge, and King's College, Aberdeen, where he took the degree of M.A. He carried on a private school, distinguished himself as a writer in the 'Monthly Review' and the 'London Magazine,' to which he contributed many articles on classical literature; subsequently entered into holy orders, and obtained some preferment in the Church. His valuable collection of books, many of them enriched with manuscript notes, was purchased by Parliament for the British Museum.

Burney, Frances. See D'ARBLAY, MADAME.

Burnham, Clara Louise (ROOT), American novelist: b. Newton, Mass., 25 May 1854. She is the daughter of George F. Root (q.v.), and has lived in Chicago since childhood. Her novels include 'No Gentleman' (1881); 'A Sane Lunatic' (1882); 'Dearly Bought' (1884); 'Next Door' (1886); 'Young Maids and Old' (1888); 'The Mistress of Beech Knoll' (1890); 'Miss Bagg's Secretary' (1892); 'Dr. Latimer' (1893); 'Sweet Clover, a Romance of the White City' (1894); 'The Wise Woman' (1895); 'Miss Archer Archer'

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(1897); 'A Great Love' (1898); 'A West Point Wooing' (1899); 'A Right Princess' (1902). She has also written libretti for her father's cantatas.

Burnham, Daniel Hudson, American architect: b. Henderson, N. Y., 4 Sept. 1846. He studied architecture in Chicago and designed notable structures there, including the Rookery, Calumet Club, the Temple, Masonic Temple, and the great Northern Hotel, as well as Ellicott Square, Buffalo, and large buildings in other cities. He was director of works at the Chicago World's Fair.

Burnham, Sherburne Wesley, American astronomer: b. Thetford, Vt., 1838. He started in life as a stenographer, and holds a post as such in the United States circuit court in Illinois. He took up astronomy as an amateur, and, in 1876, became connected with the Chicago Observatory, and later with the Lick Observatory, receiving also an appointment as professor of practical astronomy at the University of Chicago. He has made notable discoveries of double stars, having catalogued 1,274 new ones. In 1874 he was made a Fellow of the Royal Astronomical Society of England, receiving its gold medal in 1894 for his discovery and measurement of double stars.

Burnham Beeches, the fragment of an ancient forest in Buckinghamshire. It is situated some 25 miles northwest of London, and is famous for its enormous beech trees. Since 1883 the Burnham Beeches tract of 374 acres has been open to the public as a park by the Corporation of London.

Burning-bush, or **Waahoo**, a tall shrub (*Euonymus atropurpureus*) of the natural order *Celastraceæ* with oval-oblong leaves, and purple flowers occurring in fours. It is common throughout the middle west from New York to Wisconsin and Nebraska, and southward. It is sometimes cultivated for the ornamental effect of its long drooping peduncles of crimson fruit.

Burning-glass, a lens which readily brings the rays of light that fall upon it to a focus so as to cause them to kindle any combustible matter on which they are directed. The lenses commonly used as burning-glasses are convex on both sides. If a second lens, of a smaller focal distance, is placed between the first and its focus, so as to intercept the rays which pass through the first, the effect is greatly augmented. Glasses of this kind have been made with a diameter of two or three feet. Several accidents in modern times have shown that conflagrations may be caused by convex water-bottles, etc., which have the form of burning-glasses, if the rays of the sun are concentrated by them upon combustible substances lying within their reach. Burning mirrors or reflectors with a smoothly polished surface which reflects the rays of the sun and brings them to a focus may be used like burning-glasses. Spherical mirrors of this kind are the most common, but parabolic ones are the most suitable. The ancients were acquainted with such mirrors, and, as is well known, Archimedes, during the siege of Syracuse by Marcellus, is said to have set on fire the fleet of the latter by means of mirrors. Buffon in 1747, by means of a compound mirror formed of a combination of plane mirrors, set on fire, almost instantaneously, a piece of

beech wood covered with tar, at the distance of 66 feet; and with a stronger combination he afterward burned wood at the distance of 200 feet, melted tin at the distance of 150, lead at the distance of 130, and silver at the distance of 60 feet.

Burnisher, a blunt, smooth tool, used for smoothing and polishing a rough surface by pressure, and not by removing any part of the body. Other processes of polishing detach the little asperities. Agates, tempered steel, and dogs' teeth are used for burnishing. It is one of the most expeditious methods of polishing, and one which gives the highest lustre. The burnishers used by engravers are formed to burnish with one end and to erase blemishes with the other.

Burnley, a parliamentary, county, and municipal borough of England, in Lancashire, about 22 miles north of Manchester, situated on the small river Brun, near its confluence with the Calder. The town presents a modern appearance, and is, generally speaking, well built, mostly of stone. The town-hall is a large, handsome building, erected in 1887; there is also a commodious exchange, and a convenient market hall. Among the churches the chief place is due to St. Peter's, an ancient building modernized. The churches of St. James, St. Paul, and St. Andrew are all very modern structures; and there are numerous other places of worship. There are board and other schools; an ancient grammar school with modern scientific departments; mechanics' institute and technical school; public baths; and a Victoria Hospital. Burnley owns its gas, water, and electric works, public markets, and abattoirs, deriving considerable income from each. The manufactures and commerce of Burnley have rapidly increased in recent years. The staple manufacture is cotton goods, and there are large cotton-mills, worsted-mills, and several extensive foundries and machine-shops, with collieries, quarries, and other works in the vicinity. Burnley is situated on the Leeds and Liverpool Canal, has a good water supply, and has five railway stations. It seems to have been a Roman station, and various Roman remains have been dug up in and around it. Burnley was made a parliamentary borough with one member in 1867. Pop. (1901) 97,000.

Burnoose, *ber-noos'*, a large kind of mantle in use among the Bedouin Arabs and the Berbers of northern Africa, commonly made of white or undyed wool, but sometimes also of red, blue, green, or some other color, and having a hood which may be drawn over the head in case of rain. In Spain also a similar garment is worn which bears the similar name of *alborno*, and the name has also been applied to different kinds of upper garments worn by women of other European countries.

Burnouf, Emil Louis, *â-mêl loo-ê bûr-noof*, French Orientalist, cousin of Eugène Burnouf (q.v.): b. Valognes, Manche, 25 Aug. 1821. After a normal-school training, he became professor of ancient literature in the faculty of Nancy, and in 1867 director of the French School in Athens. Among his works are: 'Essay on the Veda' (1863); 'Sanskrit-French Dictionary'; 'History of Greek Literature'; 'Science of Religions'; 'The Athenian Legend'; 'The Mythology of the Japanese'; 'The City and the Acropolis of Athens'; and

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'Contemporary Catholicism' (1879). He also edited the letters of his cousin, Eugène Burnouf.

Burnouf, Eugène, è-zhān, French Orientalist: b. Paris, 12 Aug. 1801; d. there, 28 May 1852. He commenced his studies at the Collège de Louis-le-Grand, became a pupil in the École des Chartes in 1822, passed as a lawyer in 1824, and soon after devoted himself to the study of Oriental languages. In 1826 he attracted the attention of men of learning throughout Europe by publishing, in conjunction with his friend, Lassen, an 'Essay on the Pali,' or the sacred language of the Buddhists in Ceylon and the Eastern Peninsula, and in 1827 by furnishing an explanatory text to the series of lithographic plates prepared by Geringer and Chabrelle to illustrate the religion, manners, customs, etc., of the Hindu nations inhabiting the French possessions in India. This work was not completed till 1835. In 1832 he was admitted into the Academy of Inscriptions, and in the same year was appointed to the professorship of Sanskrit in the Collège de France, an office which he held till his death. His fame is chiefly due to his having, so to speak, restored to life an entire language, the Zend or old Persian language in which the Zoroastrian writings were composed. Anquetil-Duperron had obtained the text of the extant works of this sacred language of the Persians. It is the glory of Burnouf to have interpreted those works with the aid of the Sanskrit. To this part of his labors belong his 'Extrait d'un Commentaire et d'une Traduction nouvelle du Vendidad-Sadé' (1830); 'Observations sur la Grammaire de M. Bopp' (1833); 'Commentaire sur le Yagna' (1833-5). Burnouf also distinguished himself by his labors on Buddhism. On this subject he published the text accompanied by a translation of the 'Bhāgavata Purāna' (1840-7); 'Introduction à l'Histoire du Bouddhisme Indien' (1st vol. 1844), etc. A fortnight before his death the Academy of Inscriptions elected him secretary for life.

Burns, Alexander, Canadian educator: b. Castlwellan, Ireland, 12 Aug. 1834; d. 22 May 1900. He went to Canada in 1847, and was graduated at Victoria College, Toronto, in 1861, joining the Methodist Church. From 1868 to 1878 he was president of Wesleyan Ladies' College, Hamilton, Ontario. He was tried for heresy by the Ontario Methodist Conference in 1882, but acquitted.

Burns, Anthony, American fugitive slave: b. Virginia, about 1830; d. Saint Catherine's, Ontario, 27 July 1862. Escaping from slavery he worked in Boston during the winter of 1853-4; but on 24 May 1854 — the day after the repeal of the Missouri Compromise and the passing of the Kansas-Nebraska Bill had inflamed the North against the slave power — was arrested on warrant of Charles F. Suttle through his agent Brent. The next day he was taken before United States Commissioner Edward G. Loring for examination; but Wendell Phillips and Theodore Parker secured an adjournment for two days. Burns, meanwhile, was confined in the court-house under a strong guard, and on the evening of the 26th a great mass meeting in protest was held at Faneuil Hall. T. W. Higginson and others had planned to stampede the meeting into storming the court-house and rescuing Burns, and at the ap-

pointed time battered in a door and attempted the rescue themselves, relying upon assistance in their undertaking. The size of the meeting, however, prevented the signals from working well and the leaders from emerging, and after a scuffle in which a deputy was fatally stabbed and several assailants wounded, the latter retired. The next day Loring, an ardent upholder of the Fugitive Slave law, delivered Burns to his claimant on evidence entirely illegal and worthless even under that law. Escorted by a strong military guard Burns was taken to a government cutter, through streets draped in mourning and crowds ready to stone the soldiers. A riot at the wharf was only prevented by the action of Rev. Daniel Foster upon his saying "Let us pray!" The crowd uncovered and stood quiet while Burns was taken on board. Indictments were drawn against his would-be rescuers, but quashed for want of evidence. Burns afterward gained his liberty, studied theology at Oberlin College, and was eventually settled over a Baptist colored church in Saint Catharines, Ontario, where he died. Consult: Stevens, 'Anthony Burns, a History' (1856); Adams, 'Richard Henry Dana: a Biography' (1891); Higginson, 'Cheerful Yesterdays' (1898).

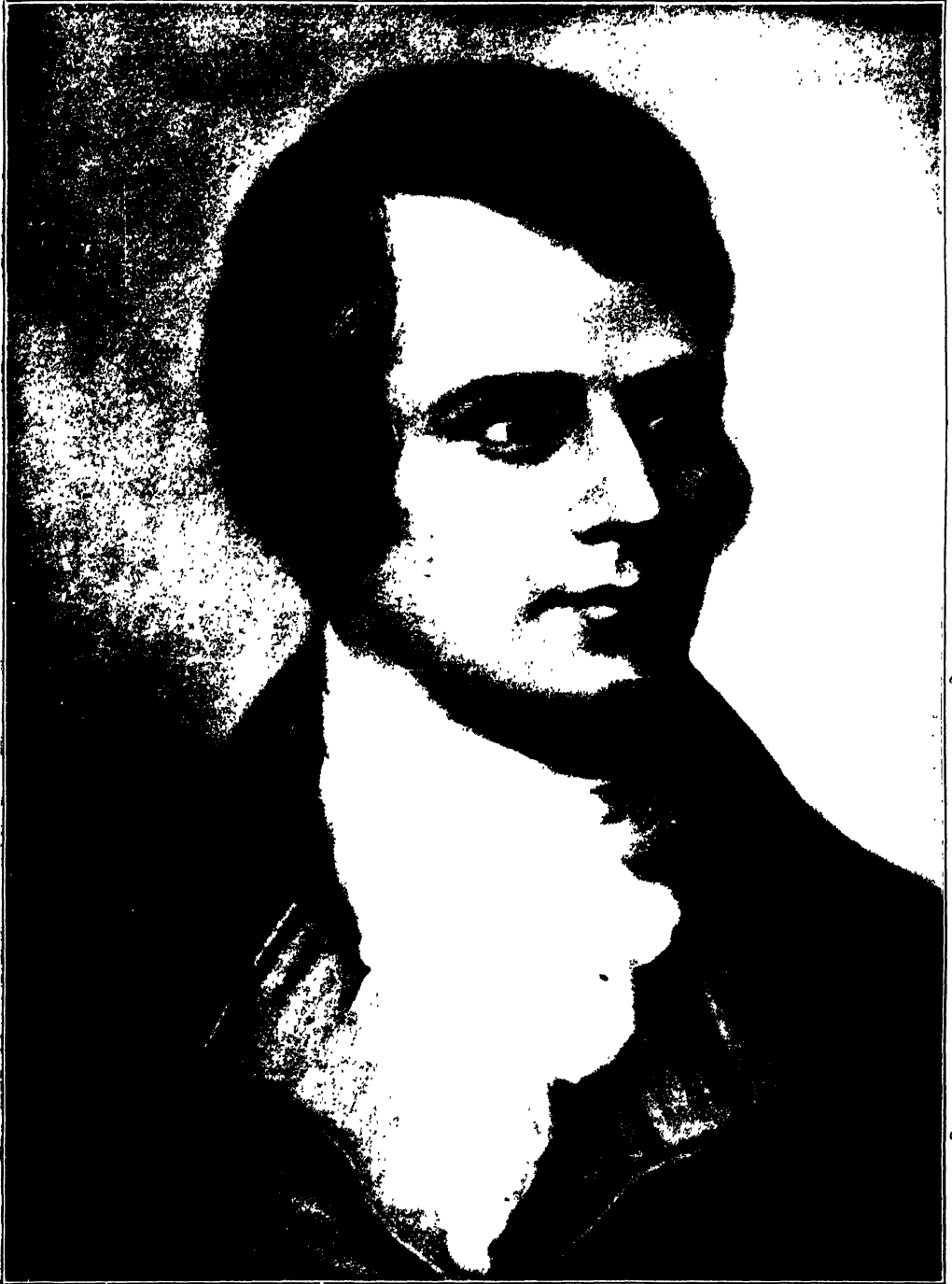
Burns, John, English labor organizer and Socialist leader: b. London, October 1858. He was of humble birth and became a factory employee at the age of 10. He was an omnivorous reader and imbibed his socialistic views from a French fellow laborer. By working a year as engineer on the Niger River, he earned enough for a six months' tour of Europe. He constantly addressed audiences of workmen, and was a persistent labor agitator. He was one of the leaders in the West End riot in London, February 1887, and was imprisoned the same year for maintaining the right of public meeting in Trafalgar Square. As an arbitrator, he is respected by employers and employed. He has been thrice elected to the London county council and has sat in the House of Commons as member of Battersea since 1892.

Burns, Robert, Scottish poet: b. Alloway, 25 Jan. 1759; d. Dumfries, 21 July 1796. His father, William Burness (for so the name was originally spelled), the son of a Kincardineshire farmer, and a worthy and intelligent man, at the time of the poet's birth occupied a few acres of land, and acted as gardener and overseer for a neighboring gentleman. His mother, Agnes Brown, belonged to Ayrshire. As a boy the poet received the greater part of his formal education from a young man named Murdock, whom his father and a few of the neighbors engaged to instruct their children. Being a great reader, and fortunate in getting access to books, he was able to make up for some deficiencies under which he might otherwise have labored; and he acquired indeed a very fair English education, besides some knowledge of French. In 1766 the Burns family removed to the farm of Mount Oliphant in the parish of Ayr, and after a tenure of 11 years to a larger and better farm, that of Lochlea in Tarbolton parish, where the father died in 1784. A fresh removal now took place to the farm of Moss-giel in the vicinity of Mauchline. Except for some years of comparative prosperity at Lochlea the family had a constant struggle with poverty,

and the poet was inured to hard farm work from his boyhood up; but although he is often spoken of as the "Ayrshire ploughman," he was never a "ploughman" in the ordinary sense of the word, that is, a mere hired farm servant. Burns began rhyming at the age of 16 or 17, but he wrote nothing of much consequence till half a dozen years later. It was not till 1786 that he published anything, this being the year in which the first edition of his poems appeared, the famous Kilmarnock edition, price three shillings, a copy of which recently sold for \$2,860. Some of the finest products of his genius had a place in this volume, such as 'Halloween'; 'The Cotter's Saturday Night'; 'The Holy Fair'; 'The Twa Dogs'; 'Poor Mailie'; 'Address to the Deil'; 'The Farmer's Salutation to His Auld Mare'; 'To a Mouse'; 'To a Mountain Daisy'; etc. 'The Jolly Beggars'; 'Death and Doctor Hornbook'; 'The Brigs of Ayr,' though not then published, belong to the same period. The book was published as much in the hope of raising money enough to enable the poet to pay his passage to the West Indies, as with the intention of bringing his name before the public. Burns at this time having got himself into difficulties in connection with his future wife, Jean Armour, and being desirous of leaving the country. The Armour scandal was the second of the kind associated with Burns' name; a former affair of the same kind was the occasion of his verses entitled 'The Poet's Welcome to His Illegitimate Child.' It was shortly before his public appearance as an author that Burns' love-affair with 'Highland Mary' occurred, but very little is really known regarding this episode in his life. His poems were hailed with delight in his own quarter of Scotland, and from the approval of Prof. Dugald Stewart, Dr. Blair, and especially Dr. Blacklock he was led to seek the applause of a wider circle. Accordingly he now gave up thoughts of emigrating, and got a second edition containing additional pieces published at Edinburgh the following year (1787). By the time it appeared he had been the lion of Edinburgh society for a season, had secured the friendly interest of the Earl of Glencairn, Henry Mackenzie ("The Man of Feeling"), and other persons of note in the metropolis (had also attracted the special notice of Walter Scott, then a lad), and had impressed all who came in contact with him by his extraordinary gifts and personality. He had also spent many a jovial night with company more congenial than grave professors and divines, and had acquired habits that left their mark on his after-life. More successful than many a poet, his second edition produced him something like \$2,500, if not considerably more. After some peregrinations through Scotland and part of England, and after another visit to Edinburgh, leading to his high-flown correspondence with "Clarinda," he married Jean Armour, and settled as a farmer at Ellisland, on the Nith, not far from Dumfries (1788). Fortune did not smile upon him here; probably had he wooed her with more assiduity he would have received more of her favors. However that may be, having first united the occupation of exciseman with that of farmer, he finally gave up the latter calling altogether, and selling off his farm stock and other belongings, retired to Dumfries (December 1791). He continued his poetic career during the Dumfriesshire pe-

riod, besides carrying on an extensive correspondence; and it is to this period that the great bulk of his songs belong, these being mostly contributed to Johnson's 'Scots Musical Museum', or written for George Thomson's 'Melodies of Scotland'. Other poems written at this time were chiefly short pieces. One important poem, however, by many considered his masterpiece, belongs to the year 1790, namely the immortal 'Tam o' Shanter,' that inimitable intermixture of humor and diablerie. In Burns' closing years there are various things to be regretted. His wife had reason to complain of his unfaithfulness. Dumfries society began to look somewhat coldly upon him, and he got himself into trouble with his superiors in the excise owing to intemperate language regarding politics and unconcealed sympathies with the early progress of the French Revolution, though for this he afterward made amends by joining the volunteers and writing patriotic verse. As a man of wit and humor as well as genius, a man whose brilliance shone all the more in the convivial circle, his society was naturally much sought after, and he allowed himself to be too often led away by unworthy or thoughtless associates. In short, he lived too fast for his constitution. By 1794 he was not the man he had been, and was afraid that he was "to suffer for the follies of his youth," as he expresses it. In a letter dated 1 Jan. 1795, he speaks of already feeling "the rigid fibre and stiffening joints of old age." Latterly he suffered much from rheumatism and rheumatic fever, and these ailments, aggravated by imprudent exposure to cold, and probably otherwise complicated, brought about his death. He was buried at Dumfries, receiving a public funeral. He left five sons and two illegitimate daughters. Two of the sons died quite young. The eldest, Robert, who had something of his father's temperament, though nothing of his genius, held for a number of years a situation in the stamp-office, Somerset House, London, and died at Dumfries in 1857. The two others, after both attaining the rank of lieutenant-colonel in the East India Company's service, died respectively in 1865 and 1872. Mrs. Burns survived her husband for 38 years, dying in 1834, aged 68. Soon after she became a widow a public subscription was raised in her behalf, and to this fund were added the profits derived from Dr. Currie's edition of Burns' works (1800, 4 vols., with life of the poet), which was published expressly in behalf of the widow and orphans.

In Burns we have perhaps the most remarkable instance among poets of variety and strength combined. Song, satire, narrative, description, dialogue, epistolary, and didactic composition, all come within his range; while in turn he delights us with humor, tenderness, pathos, sublimity, homely morality, wit and wisdom applied to the affairs of daily life. What perhaps more than all else conciliates the favor of the reader is the abounding sympathy and kindly feeling of the poet, his tenderness for all things animate and even inanimate. As one factor connected with his popularity, we may refer to the fact that—apart from some rather out-of-the-way Scottish vocabularies—he is always easily understood, indulges in no subtleties or profundities, and has always a more or less firm grasp on the realities of life. Yet it must be admitted that his poetry is very unequal, and



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that literature would have been but little the poorer if a good deal of what is included among his published writings had never seen the light. Generally speaking, his purely English poems are only of mediocre value, especially when he is simply following the models of the time and writing rather as the literary man than as the poet, and handling some theme that does not really touch his heart. Burns shows his greatest strength when, wielding his native vernacular with unsurpassable mastery, he sets before us some aspect of Scottish life and character, the manners and customs of his native district, ideas, feelings, or individual portraiture drawn from the rural or village life with which his own life was so closely interwoven. It has frequently been pointed out that Burns' verse is apt to be found defective when judged by a strictly poetic standard. His language may be picturesque, felicitous, and expressive, it may be terse, forcible, and graphic; but true poetic beauty, artistic perfection in the use of words, need hardly be looked for in Burns' verse. Nor did Burns show much originality in choice of subjects or methods of treatment. As a writer he struck out no new path for himself. Steeped as he was in the later vernacular literature of Scotland, he was content to work on the lines laid down by Scottish "makers" before his day; and having an intense admiration for the writings of such immediate predecessors as Robert Fergusson and Allan Ramsay, he was proud to follow in their steps, and eager to outstrip them, which, being a man of far higher genius, he easily accomplished. Burns' 'Holy Fair' and 'Cottar's Saturday Night,' for instance, were undoubtedly suggested by Fergusson's 'Leith Races' and 'Farmer's Ingle'; and sundry of his epistles, elegies, etc., had also their prototypes among the printed pieces of Fergusson, Ramsay, or Hamilton of Gilbertfield. Burns' favorite forms of stanza, too, were all old favorites with Scottish writers. So also in many of his songs, scraps, and snatches of older duties are interwoven and blended with materials of his own in such a way that it is impossible to say what is Burns' and what belongs to singers of an earlier day. But he has left us many inimitable songs, unquestionably of his own mint, and that range over the whole lyric field—perfidiously amatory, softly sentimental, melancholy, and pathetic; or gay and light-hearted, arch and waggish, martial and patriotic; at one time sounding the praises of friendship, love, or liquor; at another tremulous with tenderness, or breathing the spirit of manly independence. A certain class of humorous effusions at which Burns was an adept, and of which he produced a good many, were intended only for private circulation, and are only here referred to by way of completing this brief account of a man of many moods. He left a considerable number of letters, of which many are remarkable in various respects, and all are valuable for the light they throw upon the life and character of the writer. On the whole they are lacking in spontaneity and naturalness, and are too often marred by high-flown language and overstrained sentiment. Some of them are formal literary compositions rather than letters, and a certain number betray too plainly the influence of Sterne. In the "Clarinda correspondence" we have a somewhat extravagant and fantastic series of amatory epistles written to a lady (Mrs. M'Lehose) who

was living in Edinburgh, and with whom the poet became intimate when detained there for a time. In his letters to Mrs. Dunlop, a lady of good position and much older than himself, he appears perhaps at his best as a letter-writer. Of Burns the man little need here be added. His private character has perhaps been brought too much before the light of day by his biographers and critics. If some have painted it in too dark colors, others, it may be, have gone as far in the opposite direction. "The poor inhabitant below" was well aware of his own faults and follies; and probably he would have been a less interesting figure to most of his own fellow-countrymen, and to many others besides, if he had been less of a sinner and more of a saint. Burns has left a sketch of his early life in his autobiographical letter to Dr. Moore, written in 1787. The chief biographies of Burns are those by Lockart (1828); Chambers (1851); Shairp (1879); and Blackie. There are well-known essays and critical and biographical estimates by Carlyle, Wilson (Christopher North), Nichol, Stevenson, and Henley (the last showing remarkable knowledge and insight).

Burns, William Wallace, American soldier: b. Coshocton, Ohio, 3 Sept. 1825; d. Beaufort, S. C., 19 April 1892. He was graduated from West Point in 1847. He served in the war with Mexico, and also in the Union army during the Civil War, becoming major-general of volunteers. In 1865 he was brevetted brigadier-general and was for many years afterward in the Commissary Department at Washington.

Burns and Scalds, injuries produced by the application of excessive heat to the human body. They are generally dangerous in proportion to the extent of surface they cover, and a widespread scald may cause serious consequences on account of the nervous shock. Congestion of the brain, pneumonia, inflammation of the bowels, or lock-jaw may result from an extensive burn. Hence the treatment requires to be both local and constitutional. If there is shivering or exhaustion, hot brandy and water may be given with good effect, and if there is much pain, a sedative solution of opium. The local treatment consists in dredging the burn with fine flour and then wrapping it up in cotton-wool. An application of equal quantities of olive oil and lime water, called carron oil, is much recommended by some, the part being afterward covered with cotton. The main thing is to keep the air from the injured part, and therefore, when a blister forms, although it may be pricked, the loose skin should not be removed.

Burnside, Ambrose Everett, American soldier: b. Liberty, Ind., 23 May 1824; d. Bristol, R. I., 13 Sept. 1881. He served an apprenticeship to a tailor, but received a nomination to West Point, where he graduated in 1847. He left the army as first lieutenant in 1852, but returned as colonel of volunteers in 1861, commanded a brigade at Bull Run, and, in February 1862, captured Roanoke Island. Having rendered important services at South Mountain and Antietam, in November of that year he superseded Gen. McClellan. On 13 December he crossed the Rappahannock and attacked Gen. Lee near Fredericksburg, but was repulsed with a loss of over 10,000 men, and was soon after transferred to the department of Ohio. In No-

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vember 1863 he successfully held Knoxville against a superior force, and in 1864 he led a corps, under Gen. Grant, through the battles of the Wilderness and Cold Harbor. Resigning in April 1865 he was elected governor of Rhode Island (1866-8), and United States senator in 1875 and 1881.

Burnside, Helen Marion, English artist and poet: b. Bromley Hall, 1844. She published a book of poems in 1864, which made her widely known. From 1880 to 1889 she was designer to the Royal School of Art Needlework. She has published 'The Lost Letter,' 'Tales for Children,' and many occasional contributions in prose and verse to leading magazines.

Burnt Ear, a disease in grain caused by a fungus (*Uredo carbo*), which covers the seed coat with a black dust, while leaving the interior apparently uninjured, but abortive.

Burnt Offering, one of the sacrifices enjoined on the Hebrew Church and nation. It is called, in their language, *olah*, from the root *alah*, to ascend, because, being wholly consumed, all but the refuse ashes was regarded as ascending in the smoke to God. In the New Testament it is called *holokautōma*, meaning a whole burnt offering, an offering wholly burnt. In the Vulgate it is called *holocaustum*, which has the same meaning. Stated burnt offerings were presented daily, every Sabbath, at the new moon, at the three great festivals, on the day of atonement, and at the feast of trumpets. Private ones might be presented at any time.

Burnt Sienna, an ochreous earth known as sienna earth (*terra di Sienna*) submitted to the action of fire, by which it is converted into a fine orange brown pigment used in both oil and water-color painting.

Burnt Umber, a pigment of reddish-brown color obtained by burning umber, a soft earthy mixture of the peroxides of iron and manganese, deriving its name from Umbria in Italy.

Burnt Wood Work. See PYROGRAPHY.

Burntisland, *bürrnt-i'land*, Scotland, a royal burgh and seaport of Fife, on the north shore of the estuary of the Forth, 7½ miles north by west of Edinburgh. It is a favorite summer residence and bathing-place as well as a busy port. It has four churches (Established, Free, United Presbyterian, and Episcopal), a town-hall, music-hall, mechanics' library, a large board school, etc. The harbor is capacious, of great depth, and of easy access. A dock with an area of five and a half acres was completed in 1876, and extensions have since been made. A second wet dock is being constructed with a depth of 28 feet on the sill, and provided with coal-shipping machinery of the most modern type. Vegetable oil and oil-cake are made, and there are railway repairing works and a distillery. Burntisland is a steamboat ferry station on the North British Railway, and is also connected with the Forth Bridge. It unites with Kinghorn, Dysart, and Kirkcaldy in sending a member to Parliament. Pop. about 5,000.

Burr, Aaron, American clergyman: b. Fairfield, Conn., 4 Jan. 1716; d. Princeton, N. J., 24 Sept. 1757. He graduated at Yale and was settled as pastor of the Presbyterian church

of Newark, N. J. In 1748 he became president of the College of New Jersey, now Princeton University, succeeding the first president, Dickinson, who held office only a few months. He married a daughter of Jonathan Edwards, and was the father of Aaron Burr (q.v.), third Vice-President of the United States. He published a Latin grammar, known as the 'Newark Grammar,' and 'The Supreme Divinity of Our Lord Jesus Christ.'

Burr, Aaron, American statesman: b. Newark, N. J. (son of the preceding), 6 Feb. 1750; d. Port Richmond, Staten Island, 14 Sept. 1836. Before he was three years old his parents died, leaving him a considerable estate. He entered the sophomore class of Princeton College in 1769, and graduated in 1772. At the outbreak of the Revolution Burr enlisted as a private, and joined the force before Boston. He volunteered for the expedition against Canada and took part in the attack upon Quebec. For this service he was raised to the rank of major. As aide-de-camp to Gen. Putnam, Burr was engaged in the defense of New York, and shortly after (1777) was promoted lieutenant-colonel with the command of his regiment, the colonel being a civilian. He was at Valley Forge, and distinguished himself at the battle of Monmouth, where he commanded a brigade in Lord Stirling's division. During the winter of 1778 he was stationed in Westchester County, N. Y., but early in the following spring he resigned his commission, partly on account of ill health, and partly through disappointment at not being more rapidly promoted. Burr belonged to the Lee and Gates faction; he always affected to despise the military talents of Gen. Washington; and it is not improbable that these circumstances interfered with his professional career. In 1782 he was admitted to the bar in Albany, and in July of the same year he married Mrs. Provost, the widow of a British officer who had died in the West Indies. In 1783 he began to practise in New York, and soon obtained a lucrative business. In politics his success was rapid and brilliant. In 1784 he was elected to the State legislature; he was appointed attorney-general of New York in 1789, and United States senator in 1791. While in the Senate, several influential members of Congress recommended him for the mission to France, but Washington, with marked emphasis, refused to appoint him. He left the Senate in 1797, and the following year was returned to the State legislature. Some aspersions upon his conduct while in that body, which were thrown out by John B. Church, led to a duel between Burr and that gentleman, in which, however, neither party was injured. Burr was very efficient in the presidential canvass of 1800. To his efforts may be attributed the success of the Republicans in New York, upon the action of which State the result in the Union depended. On account of the prominence he thus obtained, the friends of Jefferson brought him forward for the Vice-Presidency. An equal number of votes having been thrown for Jefferson and Burr in the Electoral College, the election of a president devolved upon the House of Representatives. Most of the federal members, taking advantage of the singular turn in affairs, supported Burr. The contest lasted several days. Upon the 36th ballot Jefferson was chosen Pres-

ident, and, in accordance with the provisions of the Constitution at that time, Burr became Vice-President. His conduct in permitting himself to be used by his political opponents in order to defeat the candidate of his party, whom he himself had supported, dissolved his connection with the Republicans and destroyed his political influence. The Federalists nominated him for governor of New York in 1804. Some of the leading men of that party refused to support him, and he was defeated. The contest was bitter, and led to a duel between Burr and Alexander Hamilton (q.v.), 11 July 1804, in which the latter was killed. Burr was compelled to give up his residence in New York. After his retirement from the Vice-Presidency in April 1805, he made a journey to the southwest. His conduct gave rise to the suspicion that he was organizing an expedition to invade Mexico, with the purpose of establishing an empire there which should embrace some of the southwestern States of the Union. He was arrested in Mississippi, and taken to Richmond, Va., for trial, upon an indictment for treason. After a protracted investigation before Chief Justice Marshall the prosecution was abandoned, and Burr was acquitted in September 1807. In 1808 he went to Europe, expecting to get means to carry out his Mexican design. He was disappointed; and after living abroad four years, part of the time in extreme poverty, he returned to America in 1812. He resumed his profession in New York, but never regained his former position at the bar. In 1833 he married Mme. Jumel, a wealthy widow, but they soon separated. Mr. Burr had but one child, the accomplished Theodosia Allston. (See BURR, THEODOSIA.) In person he was below the medium height, but his manners and presence were very attractive. He was an adroit, persevering, but not a great lawyer. He cannot be said to have been an orator, yet he was an effective and ready speaker. It has been usual to regard Burr as a brilliant, and even a great man, who was led astray by moral obliquity. In regard to the looseness of his principles, there can be no doubt; but there is a growing tendency to relieve his name of much of the odium that formerly attached to it. Consult Davis, 'Memoirs of Aaron Burr' (1836); Parton, 'Life of Aaron Burr' (1858); Tompkins, 'Burr Bibliography' (1892); Todd, 'The True Aaron Burr' (1902); McCaieb, 'The Aaron Burr Conspiracy' (1903).

Burr, Edward, American soldier: b. Booneville, Mo., 19 May 1859. He studied at Washington University 1874-8, and at the United States Military Academy 1878-82, and on graduation at the latter was assigned to the corps of engineers with the rank of second lieutenant. He was promoted first lieutenant in 1883, and captain in 1894; and as lieutenant-colonel of volunteers commanded the battalion of engineers in the campaign against Santiago de Cuba in June-July 1898. He is a member of the American Society of Civil Engineers.

Burr, Enoch Fitch, American mathematician and clergyman: b. Green's Farms, Fairfield County, Conn., 21 Oct. 1818. He graduated at Yale in 1839, and became pastor of the Congregational Church in Lyme, Conn., in 1850. Since 1868 he has been a lecturer at Amherst College. Among his works are: 'A Treatise on the Application of the Calculus to the The-

ory of Neptune' (1848); 'A Song of the Sea' (1873); 'Aleph; the Chaldean' (1891).

Burr, George Lincoln, American historian: b. Oramel, N. Y., 30 Jan. 1857. He graduated at Cornell in 1881 and entered its faculty in 1888, becoming professor of ancient and mediæval history there. He has written 'The Literature of Witchcraft,' and works on superstition and persecution. He was expert in history to the Venezuelan Boundary Commission (1896-7).

Burr, Theodosia (MRS. JOSEPH ALLSTON), daughter of Aaron Burr (1756-1836): b. New York, 1783; d. 1813. She was carefully educated and became very accomplished, showing particular linguistic talent. After the death of Mrs. Burr she presided over her father's household until her marriage in 1801 to Governor Allston of South Carolina. Her correspondence with her father after her removal to the South is of great interest and shows continued devotion to his interests. Her beauty, brilliant personality, and relationship to the famous statesman drew public attention to her, especially during her father's trial, and had the effect of enlisting the public sympathy on his behalf. In 1812 she sailed from Charleston in the Patriot for New York, but the vessel was never heard from and was believed to have been lost in the storm or sunk by pirates. An unverified rumor was long current to the effect that she was made to "walk the plank."

Burr, William Hubert, American educator: b. Waterloo, Conn., 14 July 1851. He graduated at Rensselaer Polytechnic Institute 1872; was employed by the Wrought Iron Bridge Company of New York, and later on the water supply and sewerage system of Newark, N. J. He was assistant professor, and later professor of rational and technical mechanics at Rensselaer Polytechnic Institute 1876-84; became assistant engineer of the Phoenix Bridge Company 1884, and subsequently its general manager; was professor of engineering in the Lawrence Scientific School of Harvard University 1892-3; consulting engineer to the New York city department of public works 1893-5, of parks and of docks 1895-7; and later of bridges. He is author of 'The Stresses in Bridge and Roof Trusses'; 'Arched Ribs and Suspension Bridges'; 'Elasticity of the Materials of Engineering'; 'The Theory of Masonry Arches,' etc.

Burrage, Henry Sweetzer, American clergyman: b. Fitchburg, Mass., 7 Jan. 1827. He was graduated from Brown University, 1861, and entering the 36th Massachusetts as a private, rose to the rank of captain, and brevet-major of volunteers. After the war he resumed his studies, graduated at Newton Theological Seminary, 1867, was at the University of Halle, Germany, 1868-9, and became a Baptist clergyman in 1869. He was pastor at Waterville, Maine, 1869-73; editor of *Zion's Advocate*, 1873-; recording secretary of the American Baptist Union, 1876-. He has edited: 'Brown University in the Civil War' (1868); 'Henry W. Longfellow's 75th Birthday' (1882); 'History of the 36th Regiment of Massachusetts Volunteers' (1884); and has written 'The Act of Baptism in the History of the Christian Church' (1879); 'History of the Anabaptists in Switzerland' (1882); 'Baptist Writers and

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their Hymns' (1888); 'History of the Baptists in New England' (1894). 'The First Mention of Pemaquid in History' (1894); 'The St. Croix Commission' (1895).

Burrard In'let, an inlet of British Columbia, forming a fine harbor, and having Vancouver, the terminus of the Canadian Pacific Railway, on its northern shore.

Burrill, Thomas Jonathan, American naturalist: b. Pittsfield, Mass., 25 April 1839. He graduated at the Illinois State Normal University in 1865, and in 1867 was botanist of Powell's first Rocky Mountain Expedition. Since 1868 he has been a member of the faculty of the University of Illinois and has held the following offices in the University: Professor of botany and horticulture since 1868; dean of the College of Science, 1877-84; vice-president since 1879; acting president, 1889-90 and 1891-94; dean of the Graduate School since 1894. The honorary degree of LL. D. was conferred upon him in 1893 by the Northwestern University. He is a member of several American and foreign scientific societies, and is well known from his writings under more than 100 titles mostly upon the parasitic diseases of plants, bacteriology, microscopy, fruit growing, forestry, landscape gardening, and modern education.

Bur'ritt, Elihu, ē-lī'hū ("THE LEARNED BLACKSMITH"), American reformer: b. New Britain, Conn., 8 Dec. 1811; d. 7 March 1879. The son of a shoemaker, he was educated in the common schools of his native village, and at the age of 16 was apprenticed to a blacksmith. An early conceived project of reading the Scriptures in their original languages led him to philological studies in the intervals of labor, and by diligence and a remarkable facility he was soon able to understand works in several languages. He removed to Worcester to take advantage of the library of the Antiquarian Society there, and while still plying his trade became acquainted with the principal ancient and modern languages. In 1846 he went to England, where he formed the "League of Universal Brotherhood," whose object was "to employ all legitimate means for the abolition of war throughout the world." He was constantly engaged in writing and lecturing, and took a prominent part in all the European peace congresses. He returned to America in 1853. He was consular agent at Birmingham, 1865-8. The promotion of temperance, cheap ocean postage, and the abolition of American slavery were leading objects of his continued exertions. His principal publications are: 'Sparks from the Anvil' (1848); 'Thoughts and Things at Home and Abroad' (1854); 'Chips from Many Blocks,' etc.

Burritt College, a co-educational institution, in Spencer, Tenn.; organized in 1848 under the auspices of the Christian Church; reported at the end of 1899: Professors and instructors, 10; students, 192; volumes in the library, 3,560; grounds and buildings valued at \$20,000; income, \$2,750; number of graduates, 165.

Burro. See DONKEY.

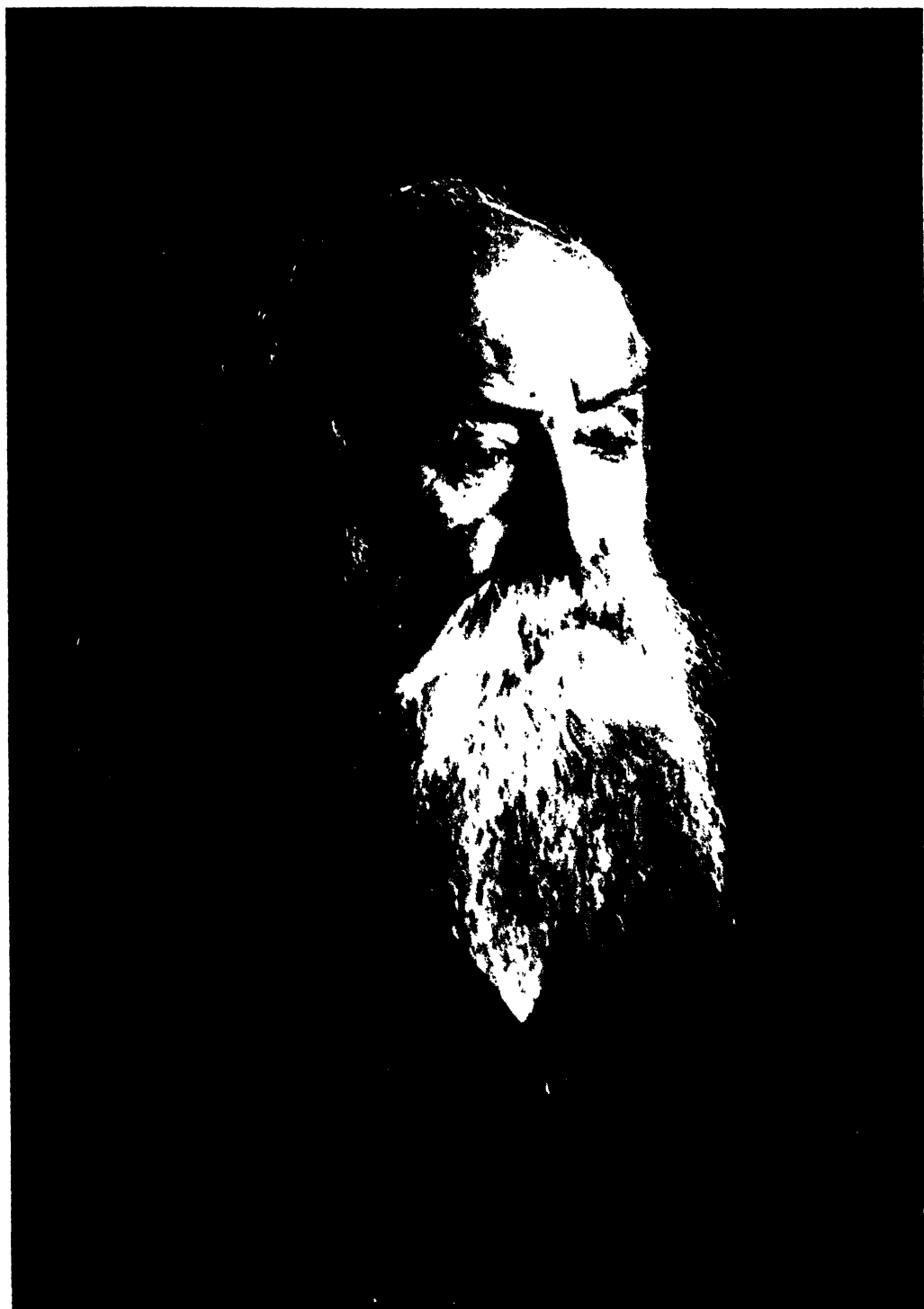
Burrough, or Borough, Stephen, English navigator; b. Devonshire, 25 Sept. 1525. Being employed to search for a northeast passage to the Indies, he set out in 1556, and after doubling

the North Cape sailed along the north coast of Russia, touched at Nova Zembla and the Isle of Waigatz, and reached lat. 70° 30' N. The account of his voyage, contained in Hakluyt's collection, proves him to have been an active and intelligent sailor.

Burroughs, George, American clergyman: d. Salem, Mass., 19 Aug. 1692. He was graduated at Harvard College in 1670, was a preacher at Falmouth, now Portland, Me., in 1676, and at Salem in 1680. In consequence of some dispute with his people he returned to Portland in 1683, but, when that town was destroyed by the Indians in 1690, came back to Salem. Though a person of unblemished character, he became one of the victims of accusation by the confessing witches. It was testified that two of his wives had appeared to the witnesses, saying that he was the cause of their death, and threatening, if he denied it, to appear in court. He was also accused of performing feats of extraordinary strength by diabolical assistance, such as carrying a barrel of molasses, holding out a gun by a finger placed in the muzzle, and of having "tortured, afflicted, pined, consumed, wasted, and tormented" one Mary Wolcott. Although he asserted his innocence so as to draw tears from the spectators, and recited the Lord's Prayer, which it was supposed no witch could repeat without mistake, he was condemned and executed.

Burroughs, George Stockton, American educator: b. Waterloo, N. Y., 6 Jan. 1855. He graduated at Princeton College, 1873, and at its Theological Seminary, 1877. He removed to New England in 1880, and served in the ministry of the Presbyterian Church in Fairfield and New Britain, Conn. He was professor of biblical literature at Amherst College, 1886-92; president of Wabash College, Crawfordsville, Ind., 1892-9; and became professor of Old Testament language and literature in Oberlin Theological Seminary in 1899.

Burroughs, John, American essayist and naturalist: b. Roxbury, N. Y., 3 April 1837. He taught school for about eight years, was for a time a journalist, and then became a clerk in the Treasury Department and subsequently a national bank examiner. He settled on a farm in New York State and has since devoted himself to fruit-culture, nature-study, and literature. Many of his papers were written in his bark-covered study (to which he has given the name "Riverby") on the banks of the Hudson. The personal element is very marked in his writings, and the charm of his easy familiar style has done much to popularize the study of nature. His books on rural themes include: 'Wake Robin' (1871); 'Winter Sunshine' (1875); 'Birds and Poets' (1877); 'Locusts and Wild Honey' (1879); 'Pepacton; Notes of a Walker' (1881); 'Fresh Fields' (1884); 'Signs and Seasons' (1886); and 'Sharp Eyes' (1888); 'Indoor Papers.' He has also written 'Notes on Walt Whitman' (1867); 'Whitman: a Study' (1897); 'The Light of Day'; and 'Squirrels and Other Fur-Bearers.' In 1903 he accompanied President Roosevelt on a trip through the West, including a lengthy sojourn in the Yellowstone National Park in close communion with the wild life of that magnificent game preserve.



JOHN BURROUGHS.
AUTHOR AND NATURALIST.

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Burroughs, Marie (LILLIE ARRINGTON), American actress: b. San Francisco, 1866. At the age of 18 she went to New York and made her début as Gladys in 'The Rajah,' assuming the stage name of Marie Burroughs. She appeared as Mary Bleakern in 'The Middleman,' Vashti in 'Judah,' etc. In 1894 she was the star in 'The Profligate.' In 1899 she acted with Stuart Robson in 'The Meddler' and in 1900 filled the role of Guida Landresse in 'The Battle of the Strong.'

Burroughs, Stephen, American adventurer: b. Hanover, N. H., 1765; d. Three Rivers, Canada, 28 Jan. 1840. The son of a Congregational clergyman, his vicious jokes and propensity to trick people into misadventures made him early reputed the worst boy in town. At the age of 14 he ran away from home to join the army, which he later deserted. After studying under a clergyman in Connecticut, he entered Dartmouth College, where he continued his mischievous career. He left the college clandestinely before graduating, and was successively privateersman, ship's physician, and schoolmaster. At length he determined to go where he was unknown and preach. Under the name of Davis he had excellent success as pastor of a Congregational church in Pelham, Mass., until after nearly six months his character was revealed by persons who had formerly known him. Having entered into relations with a gang of counterfeiters, though still occasionally preaching, he was arrested in Springfield for passing counterfeit money, and convicted. He was imprisoned at Northampton, and for his numerous attempts to escape was loaded with chains. He sought to end his sufferings by firing the jail and was afterward removed to Castle Island in Boston harbor, whence he effected his escape with seven other prisoners, but was retaken. When he was released he went to Canada, where for many years he was at the head of an association of counterfeiters. In the latter part of his life he thoroughly changed his conduct, joined the Roman Catholic Church, and passed his last years in receiving and educating at his residence the sons of wealthy Canadian gentlemen. He was beloved by his pupils, had an extensive library of choice books, and was noted for his happy faculty of communicating his great stores of knowledge. Few men have possessed equal capacity, and even during the worst part of his career his charitable deeds were hardly less remarkable than his iniquities. He described his early life in two autobiographical volumes, written with great naturalness and force.

Burrowing Owl, a small owl (*Speotyto cunicularia*) common on the open plains of both North and South America, where it makes its nest in burrows. It is mottled gray in color, has very long legs, scantily feathered, and stands erect upon them in a manner different from that of owls generally. It is gregarious, and is especially prevalent on the North American plains in the "towns" of the prairie dogs; and in South America it lives with the vizcachas, and caviés, and is thought to warn them by its excited notes whenever an enemy approaches. Among the many unowl-like traits of this curious little exile from the woods is its cry, which has no resemblance to the ordinary hoot of an owl, but more nearly resembles the chattering

of a cuckoo. This owl makes its home wherever it can in some abandoned burrow of a ground-squirrel or other animal, but, failing this, it digs a little cave-like hole of its own, which it furnishes with a bed of soft materials, whereon are laid about eight globular white eggs. The food of these owls consists almost entirely of insects and mice. Consult Coues, 'Birds of the Northwest' (Washington 1874); Sclater and Hudson, 'Argentine Ornithology' (London 1888).

Burrowing Perch. See CULPER.

Burrows, William, American naval officer: b. near Philadelphia, Pa., 6 Oct. 1785; d. at sea, 5 Sept. 1813. He served in the war with Tripoli and commanded the sloop Enterprise in its successful action with the British brig Boxer off the coast of Maine. Both Burrows and the British commander were killed in the fight, and they were buried side by side at Portland. Congress struck a medal in honor of the victory and its hero.

Bursar, or **Bursary**, an endowment in one of the Scotch universities, corresponding to an exhibition in an English university, and intended for the support of a student during his ordinary course, and before he has taken a degree in the faculty in which he holds the bursary. Each of the four universities of Scotland has a greater or smaller number of bursaries. As yet the University of Aberdeen is better provided than any of the others with this class of endowments. Bursaries are in the gift sometimes of the Senatus Academicus of the university to which they belong, sometimes of the town-council of the city in which the university is situated, and sometimes of private individuals. With regard to the manner in which they are bestowed, some are obtained after competitive examination, and others are given by the patrons for special reasons. As the former method of bestowing them is found to be the more beneficial in its results, it is gradually becoming the prevailing one, as at Aberdeen it has always been. Bursaries which are in the gift of the Senatus Academicus are all bestowed in this way.

Burschenschaft, boor'-shën-shäft, an association of students in Germany, formed in 1815, which had for its object the political regeneration of Germany.

Burs'lem, England, a market town and municipal borough in Staffordshire, within the parliamentary borough of Hanley, in "The Potteries." It is well built, chiefly of brick; has electric tramways, a fine town-hall, covered market, public baths, hospital, and the Wedgwood Institute, comprising a free library, a museum, and a school of art, erected in honor of Josiah Wedgwood, who was born at Burslem in 1730. The building is an excellent exemplification of the structural application of ceramics. Burslem has four Established churches, and places of worship for Independents, Baptists, Methodists, and Roman Catholics. It has extensive manufactures of china and earthenware, and carries on coal mining. Pop. (1901) 38,766.

Burt, Mary Elizabeth, American educator: b. Lake Geneva, Wis. She studied at Oberlin College and entered the teaching profession. For three years she was a member of the Chicago board of education. Later she undertook

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editorial work and lecturing. She edited 'Little Nature Studies for Little People'; 'Seed Thoughts from Robert Browning,' etc.: has contributed frequently to periodical literature and is the author of: 'Browning's Women'; 'Literary Landmarks'; 'The World's Literature'; 'German Iliad (Siegfried)'; 'Stories from Plato and other Classic Writers'; and collaborated in writing 'The Literary Primer,' and 'The Boy General.'

Burt, Thomas, English labor leader: b. Northumberland, 12 Nov. 1837. He began work in the coal-mines at 10 years of age. In 1865 he began to take an interest in the labor movement and soon became prominent as a trades-unionist. He was president of the Trades Union Congress in 1891. Since 1874 he has had a seat in Parliament as a Liberal.

Burt, William A., American surveyor: b. Worcester, Mass., 13 June 1792; d. 18 Aug. 1858. After acting as a surveyor in New York State he removed to Michigan in 1824. Between 1840 and 1847 he surveyed a great part of northern Michigan. He introduced improved methods of surveying and invented the solar compass. He was judge of the Michigan circuit court and member of the legislature, and one of the projectors of the Sault Ste. Marie canal.

Burton, Ernest De Witt, American Biblical scholar: b. Granville, Ohio, 4 Feb. 1856. He graduated at Denison University in 1876 and at Rochester Theological Seminary in 1882, and went to Europe for further study in Leipsic and Berlin. From 1882-3 he taught in the Rochester Theological Seminary; and from 1883-92, in the Newton Theological Institute, first as associate professor and later as professor of New Testament Interpretation. In 1892 he was appointed head professor of New Testament Interpretation in the University of Chicago. Among his works are: 'Syntax of the Moods and Tenses in New Testament Greek'; 'Harmony of the Gospels for Historical Study' and 'Handbook of the Life of Christ' (in collaboration with W. A. Stevens); 'Records and Letters of the Apostolic Age'; 'Handbook of the Life of Paul'; 'Constructive Studies in the Life of Christ' (in collaboration with Shailer Mathews). In 1892 he became associate editor of the 'Biblical World,' and in 1897 of the 'American Journal of Theology.'

Burton, Sir Frederick William, Irish artist: b. Limerick, 1816; d. London, 15 March 1900. He received his education in Dublin. He was elected to the Royal Hibernian Academy in 1837, and in 1842 exhibited at the London Royal Academy. He is best known for his work as director of the National Gallery in London, to which post he was chosen in 1874, and which he held for 20 years.

Burton, John Hill, Scottish historian: b. Aberdeen, 22 Aug. 1809; d. 10 Aug. 1881. He was educated at the grammar school and Marischal College in that city. He studied law and was admitted to the bar in 1831. He never succeeded in gaining much practice, and soon turned his attention to literature, contributing to the 'Westminster,' the 'Edinburgh' and 'North British' reviews, as well as being a member of the staff of the *Scotsman*. With Sir John Bowring he edited Bentham's works, as well as an

illustrative 'Benthamiana,' with the aim of making more widely known the opinions of the great apostle of utilitarianism and radicalism. His first original work of importance, was the 'Life and Correspondence of David Hume' (1846), followed next year by the 'Lives' of Lord Lovat and Duncan Forbes of Culloden. In 1849 he published his 'Political and Social Economy'; in 1852 he compiled 'Narratives from Criminal Trials in Scotland.' He commenced in 1853 the publication of his chief work, the 'History of Scotland,' with two volumes covering the period from the Revolution of 1688 to the extinction of the last Jacobite rebellion in 1746. This was afterward completed by seven volumes commencing with Agricola's invasion and ending with the Revolution of 1688. A second edition of the complete history was published in eight volumes in 1873. A series of literary and historical sketches contributed to 'Blackwood's Magazine' formed the basis of two of his best-known books, 'The Scot Abroad' and 'The Bookhunter.' His last important historical work was the 'History of the Reign of Queen Anne' (1880). In 1854 Mr. Burton was appointed secretary to the Scottish Prison Board, and he continued his connection with this department as a commissioner of prisons until his death. The success of his 'History of Scotland' brought him the appointment of historiographer royal for Scotland, the degree of LL.D. from Edinburgh University, and that of D.C.L. from Oxford.

Burton, Lewis William, American clergyman: b. Cleveland, 9 Nov. 1852. He was educated at Kenyon College and the Philadelphia Divinity School; took orders in the Protestant Episcopal Church in 1878, and was successively in charge of parishes in Cleveland, Richmond, and Louisville. In 1896 he became bishop of Lexington, Ky.

Burton, Richard, American poet and journalist: b. Hartford, Conn., 14 March 1859. He graduated from Trinity College, Hartford, and took a degree at Johns Hopkins University. His published poems are 'Dumb in June' (1895), and 'Memorial Day' (1897).

Burton, Sir Richard Francis, English traveler, linguist, and author: b. Barham House, Herfordshire, 19 March 1821; d. Trieste, Austria, 20 Oct. 1890. He was educated at Oxford, with the intention of entering the Church; but in deference to his own urgent request, his father obtained a commission for him in the East India Company's service. He joined the army in 1842, served for some years in Sind, under Sir C. Napier, explored the Neilgherry Hills, published an important work on Sind, and acquired a complete knowledge of the Persian, Afghan, Hindustanee, and Arabic languages. Returning to England in 1851, he soon afterward set out to explore Arabia, disguised as an Afghan pilgrim, and published on his return a 'Personal Narrative of a Pilgrimage to El-Medina and Mecca' (1855), as the result of this daring adventure. His next expedition was into the Somali country in East Africa, from whence he proceeded to the Crimea, where he was chief of the staff of Gen. Beatson, and organized the irregular cavalry. After peace was proclaimed, Burton set out in 1856 along with Capt. Speke to explore the lake region of Central Africa. The expedition was absent three years, and dur-

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ing that time the great Lake Tanganyika was discovered by Burton. Subsequently he made a journey in the western states of North America, and published an account of the Mormon settlement at Utah, in his 'City of the Saints.' In 1861 he married, and he received the same year an appointment as consul at Fernando Po. While fulfilling his duties here he explored the Bight of Biafra, visited the Kamerun Mountains, and conducted a dangerous mission to the king of Dahomey. Afterward he was transferred to the consulate of Santos in Brazil, and here he explored his own province, visited the Argentine Republic, crossed the continent to Chile and Peru, returned home after exploring the Pacific coast, and published his 'Explorations of the Highlands of Brazil.' He was now (1871) made consul of Damascus, but was soon recalled, and in the following year, after a journey to Iceland, an account of which he wrote, he was appointed consul at Trieste. While occupying this position he led two expeditions into Midian (1876-8); and in company with Commander Cameron he conducted an expedition into the gold-producing country behind the Gold Coast. He remained English consul at Trieste until his death. In his latter years his services to geographical science were acknowledged by the gold medals of the French and English geographical societies, while in 1886 his services to his country were tardily recognized by the honor of knighthood. Besides the books of travel already mentioned, he was the author of many others, such as: 'Sind, or the Unhappy Valley' (1851); 'Goa and the Blue Mountains' (1851); 'Falconry in the Valley of the Indus' (1852); 'First Footsteps in East Africa' (1856); 'The Lake Region of Central Africa' (1860); 'Abeokuta, or an Exploration of the Kamerun Mountains' (1863); 'Narrative of a Mission to the King of Dahomey' (1864); 'The Nile Basin' (1864); 'Vikram and the Vampire' (1869); 'Zanzibar' (1872); 'Two Trips to Gorilla Land' (1875); 'Ultima Thule, or a Summer in Iceland' (1875); 'Etruscan Bologna' (1876); 'Sind Revisited' (1877); and 'The Gold Mines of Midian' (1878). In 1885-8, he published a remarkable literal translation of the 'Arabian Nights' entitled 'The Thousand Nights and a Night.' His manuscript translation with notes, from the Arabic of 'The Scented Garden,' of great value to scholars, was burned by his widow, who deemed it an immoral work. Consult lives by Hitchman (1887); Lady Burton (1893); Stisted (1897).

Burton, Robert, English clergyman and author: b. Lindley, Leicestershire, 1576; d. 1640. He was educated at Oxford, took orders, and became rector of Seagrave in Leicestershire. His learning, which was various and extensive, is copiously displayed in the 'Anatomy of Melancholy,' by Democritus Junior, first published in 1621, and repeatedly reprinted. He was a man of integrity and benevolence, but subject to strange fits of hypochondriac melancholy which rendered his conduct flighty and inconsistent. He is reputed to have undertaken the composition of his 'Anatomy of Melancholy' with a view to the dissipation of his morbid feelings. Among those who have been most deeply indebted to Burton is Sterne, as may be seen in his 'Tristram Shandy.'

Burton, William Evans, English comedian and author: b. London, 24 Sept. 1804; d. New York, 10 Feb. 1860. He received a classical education, intending to adopt the ministry as a profession. In 1822 he took charge of a printing establishment and edited a magazine. His first appearance on the stage was at the Haymarket in 1832. He was very successful both in Great Britain and the United States; and built the National Theatre in Philadelphia, and owned another in New York. He compiled a 'Cyclopædia of Wit and Humor.'

Burton-upon-Trent, England, a municipal and county borough, in Staffordshire, on the north bank of the Trent, in a low, level situation. It is substantially built. Malting and ironfounding are carried on to a considerable extent, but it is chiefly celebrated for its excellent ale, of which vast quantities are made for both home consumption and exportation. There are about 20 breweries at work, giving employment in the various departments of the trade to about 10,000 men and boys. The largest brewing establishments are those of Messrs. Bass & Co., and Messrs. Allsopp, the former of which covers considerably more than 100 acres of ground. These two companies alone are said to pay to government £800,000 annually as duty on the ale brewed by them. Contrary to common usage, the brewers employ hard water obtained from wells instead of soft water. There are in all about 50 places of worship in the town, which also possesses a grammar school, girls' high school, numerous board and other elementary schools, four blocks of alms-houses, a dispensary and infirmary, a public library and reading-rooms, school of science and art, handsome public baths, etc. Pop. (1901) 50,400.

Burt'sell, Richard Lalor, American clergyman: b. New York, 14 April 1840; d. 1902. He studied in Rome and was ordained to the priesthood in 1862. After returning to the United States and having charge of parishes in New York he was appointed "defender of the marriage tie" being the first to fill this office, which in 1884 was instituted in the Catholic Church in the United States. Having become connected with the movement headed by Rev. Dr. McGlynn, he was retired from his parish to one of less prominence in 1890. His appeals to ecclesiastical authority for redress were unsuccessful.

Buru, boo-roo', or **Boeroe**, Malaysia, an island of the archipelago, in the residency of Amboyna, from which it lies about 40 miles to the west. Area, with the small island of Amblau, 3,360 square miles; population variously estimated at from 10,000 to 50,000. The marshy coast lands are notoriously unhealthy, but lofty mountains rise in the interior, one peak (Tomahoe) attaining an altitude of 10,320 feet. A dense natural forest covers most of the country, and only a very small portion has been brought under cultivation. The soil is rich, and vegetation everywhere luxuriant; but the only important article of export is cajeput oil.

Burwash, Nathanael, Canadian educator: b. Argenteuil, near Saint Andrews, Quebec, 25 July 1839, of a loyalist family, who left Vermont during the American Revolution. He was educated at Victoria College, Cobourg, and Yale University, and entered the Methodist ministry in 1860. He was professor in Victoria Col-

BURY — BURYING-PLACES

lege, 1867-73; dean of faculty of theology in 1873, and has been president and chancellor of Victoria University, Toronto, from 1887. He was secretary of education for the Methodist Church in Canada, 1874-86, and has devoted much time toward bringing about university federation in the province of Ontario. He has published 'Memorials of Edward and Lydia Jackson' (1874); 'Wesley's Doctrinal Standards' (1881); 'Handbook on the Epistle to the Romans' (1887); 'Inductive Studies in Theology' (1896); 'Manual of Christian Theology' (1900); 'Life and Times of Egerton Ryerson' (1902).

Bury, bĕr'i, John B., Irish scholar: b. 16 Oct. 1861. He was graduated from Trinity College, Dublin, of which he is a Fellow; in 1893 became professor of modern history in Dublin University, and professor of Greek there in 1898. He has written 'History of the Later Roman Empire from Arcadius to Irene' (1889); 'Student's History of the Roman Empire from Augustus to Marcus Aurelius' (1893); 'History of Greece to Death of Alexander the Great' (1902); and has edited Pindar's 'Isthmian Odes'; and 'Nemean Odes'; Freeman's 'History of Federal Government in Greece and Italy'; and Gibbon's 'Decline and Fall of the Roman Empire.'

Bury, Richard de, or Richard Aungerville, English clergyman and author: b. 1281; d. 1345. He was made bishop of Durham in 1333. His principal work, 'Philobiblon,' was intended to serve as a handbook to the library which he founded in connection with Durham College at Oxford (afterward suppressed). It gives an interesting account of how he collected his library, describes the state of learning in England and France, and closes with an explanation of the rules for the management of his library, which were founded on those adopted for the library of the Sorbonne.

Bury, bĕr'i, England, a municipal and parliamentary borough, in Lancashire, eight miles north-northwest of Manchester. It is well situated on a rising ground between the Irwell and the Roche, and, being much improved in recent times, now presents the appearance of a clean and well-built town. It has a handsome town hall, an athenæum, a technical school and art gallery, a savings bank, the Bury Bank, Trevelyan Club, and Philips Hall, grammar school, public baths, railway station, etc. Among the churches, St. Mary's (the parish church) and St. Thomas' are perhaps the finest, being highly ornate Gothic buildings with tower and spire. There is also a handsome chapel belonging to the United Methodist Free Church, a fine Presbyterian church, and a Roman Catholic chapel. The staple manufacture is that of cotton, and there are also large woolen factories, bleaching and printing works, dyeworks, foundries, etc. The late Sir Robert Peel was born at Chamber Hall in the vicinity in 1788; and a bronze statue of him adorns the town. Bury was made a parliamentary borough, returning one member in 1832. Pop. about 60,000.

Bury St. Edmund's, England, a parliamentary and municipal borough in Suffolk, situated on the Lark, 26 miles from Ipswich. It contains four churches, two of them being fine old Gothic edifices. These are places of worship belonging to the Independents, Methodists,

Baptists, and others; and among other buildings a shire-hall, a guild-hall, a corn exchange, athenæum, with library, etc. Agricultural implements are manufactured, and there is a large trade in agricultural produce. Of many benevolent institutions the principal is a free grammar school founded by Edward VI. Bury St. Edmund's sends one member to Parliament. It is an ancient place, and derived its name from St. Edmund, a king of the East Angles, who was buried here. The barons in John's reign met here, and swore to obtain the ratification of Magna Charta. Bury St. Edmund's contains the remains of an abbey, once the most wealthy and magnificent in Great Britain. Pop. about 17,000.

Burying-beetles, coleopterous insects of the family *Silphida*. The carrion or sexton beetles are useful in burying decaying bodies of birds, mice, etc., in which they lay their eggs. The larvæ are crustaceous, flattened, with the sides of the body often serrated, black and of a fetid odor. They undergo their transformations in an oval earthen cocoon. In *Necrophorus* the antennæ have 10 apparent joints, and the rounded club is four-jointed. The genus *Silpha*, of which *S. lapponica* is a common species, differs in the third joint of the antenna being no longer than the second but shorter than the first. In *Necrophilus* the third joint is as long as the first. *N. surinamensis* has a yellow thorax with a central irregular black spot. *Catops* and its allies live in fungi, carrion, and ants' nests, and are small, black, oval insects. There are between 800 and 900 species of the family, many of which are small and live in caves (see CAVE-DWELLING ANIMALS) or in nests of ants.

Burying-places, localities of sepulture of the dead. The custom of burying the dead in public places prevailed among the most ancient nations, including the Romans, who afterward, in the flourishing periods of the republic, burned their dead and kept the ashes in tombs, collected in urns. The ancient Germans buried their dead in groves consecrated by their priests. With the introduction of the Christian religion consecrated places were appropriated for the purpose of general burial; and it was regarded as ignominious not to be buried in consecrated earth. The deprivation of the rites of burial was therefore part of the punishment of excommunication. The Romans provided their grave-stones, upon which were inscribed the name of the deceased, and the wish, *Sit illi terra levis* ("May the earth rest lightly upon him"). This custom was preserved by the Christians. The Egyptians, Greeks, and Romans erected over the graves of men of rank, or persons otherwise remarkable, pyramids, mausoleums, or temples. After the introduction of Christianity little churches, called chapels, were erected over the dead. Early Christian martyrs were often buried in caverns, which by degrees were enlarged to spacious subterranean vaults. Subsequently others considered themselves happy if their bones were allowed to repose near the ashes of a martyr. As early as the 4th century the Christians built churches over the sepulchres of the holy martyrs; and in the belief that a place was sanctified by their ashes they anxiously sought out, on the erection of new churches in cities, or the transformation of heathen temples into

BUSACO — BUSCHING

Christian churches, the remains (relics) of the martyrs, and buried them under the altar of the new church to communicate to it a character of greater sanctity. The Emperor Constantine, who died in 337, is supposed to have been the first person who ordered his tomb to be erected in a church. This was done in the Church of the Apostles at Constantinople, of which he was the founder, and therefore probably considered himself as peculiarly entitled to this privilege. He was soon imitated by the bishops, and later all those who had enriched the Church were distinguished by this honor. The Emperors Theodosius and Justinian, indeed, forbade the erection of sepulchres in churches, but in vain. Leo the Philosopher again permitted them to everybody. At present interment in churches is almost everywhere suppressed, or at least permitted only under certain restrictions. Even in Naples and Rome the general practice of erecting sepulchres in churches was forbidden in 1809, and the foundation of burial places without the city was provided for. The custom introduced by the communities of Moravian Brothers, who form their burial places into gardens, is now becoming general; and cemeteries, instead of exhibiting merely dull ranges of tombstones, are adorned with flower plots and ornamental shrubbery. The celebrated burying-place of Père la Chaise, near Paris, is one of the most beautiful and interesting spots in the world. See also CATACOMBS.

Busaco, boo-sä'kō, a hamlet in the province of Beira, on the north side of the river Mondego. It is memorable for the battle, 27 Sept. 1810, between Wellington and Masséna. Wellington, with about 40,000 men on a retreat before Masséna, with a force of 65,000, availed himself of the favorable position of the sierra or ridge here for checking the pursuit.

Busbecq, or **Busbequius**, **Ogier Ghislain de**, ō'jī-er gēz-lān de bus-bēk, Flemish diplomatist and author: b. Comines, 1522; d. 1592. After having studied in the most celebrated universities of Flanders, France, and Italy, he entered the service of Ferdinand, king of the Romans, who in 1555 sent him as ambassador to Constantinople. After seven years he returned home, and next was sent to accompany the Archduchess Elizabeth (who was to be married to Charles IX.) on her journey to France. Busbecq remained there as steward to Elizabeth, and when she left France, after the death of her husband, he remained as ambassador of Rudolph II. Two important works of his survive, 'Legationis Turcicæ Epistolæ Quatuor,' in which the policy, the power, and the weakness of the Porte are so profoundly and clearly explained that even at present information may be drawn from them; and 'Epistolæ ad Rudolphum II.,' a very important work for the history of those times. His style is pure, elegant, and simple. During his stay in Turkey he collected Greek inscriptions and manuscripts.

Busby, büz'bī, **Richard**, English schoolmaster: b. Lutton or Sutton, Lincolnshire, 22 Sept. 1606; d. 6 April 1695. He was educated at Westminster School and at Oxford, where he entered Christ Church in 1624, and graduated B.A. four years later, and M.A. in 1631. He became a tutor of his college, and at the age of 33 was appointed prebendary and rector of Cudworth, in Somersetshire. In 1638 he was provi-

sionally appointed headmaster of Westminster School, and two years later was confirmed in this appointment, which he held continuously till his death. He was strict in discipline and a successful teacher, and among his pupils were many of the greatest men of his time, Dryden, Locke, Atterbury, South, Henry, Hooper, and others. His published works were mainly school books, now long out of date. He was buried in Westminster Abbey.

Busby, a military headdress worn by hussars, artillerymen, and engineers, consisting of a fur hat, with a bag of the same color as the facings of the regiment hanging from the top over the right side. The bag appears to be a relic of a Hungarian headdress, from which a long padded bag hung over, and was attached to the right shoulder as a defense against sword cuts.

Busch, **Moritz**, German publicist: b. Dresden, 13 Feb. 1821; d. 1899. He was educated at Leipsic, and in 1847 began his literary work by translating a number of the novels of Dickens and Thackeray. As a member of the Radical party he was disappointed by the failure of the revolutionary movement of 1848, and came to the United States in 1851, but returned to Germany in 1852. He also traveled in the Orient in behalf of the Austrian Lloyds. In 1856 he became editor of the *Grenzboten*, and in this paper defended the policy of Bismarck. In April 1870 he was appointed to a position in the Foreign Office, and accompanied Bismarck to France at the time of the Franco-Prussian war. In 1873 he gave up his official position to become the editor of the *Hannoverschen Kuriers*, but continued to be a confidant of Bismarck and strongly advocated the chancellor's policy in his articles for the press. After his visit to the United States he wrote 'Journeys from the Hudson to the Mississippi,' and 'The Mormons.' Other works of his are: 'American Humorists' (translations of selections from Mark Twain, Bret Harte, etc.); 'The History of the International'; 'The Humor of the German People'; 'Count Bismarck and His People During the War with France'; 'Our Chancellor' (a life of Bismarck); and 'Bismarck; Some Secret Pages of His History' (translated into English).

Busch, **Wilhelm**, German cartoonist: b. Wiedensahl, Hanover, 15 April 1832. He first studied engineering at the Polytechnic School at Hanover, but later studied art at the academies of Dusseldorf, Antwerp, and Munich. In 1859 he drew his first cartoons for the 'Fliegende Blätter.' His work is marked by keen satire and his later productions are far behind his earlier in form. He published a series of his sketches with explanatory text, including 'Saint Antonio of Padua'; 'The Pious Helena'; 'Father Filucius'; 'Max and Moritz'; and 'Hans Hucklebein.'

Büsching, **Anton Friedrich**, än-tōn frēd'-rīh bu'shīng, German geographer: b. Stadthagen, Schaumburg-Lippe, 27 Sept. 1724; d. Berlin, 28 May 1793. He studied theology in Halle from 1744, and was for a time minister of a Protestant church in St. Petersburg. When acting as a traveling tutor he became convinced of the defects of existing geographical treatises, and resolved to write a new one, which he began on his return to Germany in 1752, by publishing

a short description of Schleswig and Holstein as a specimen. In 1754 he was made professor of philosophy in Göttingen. In 1766 he was made director of the united gymnasiums of Berlin and the suburb Kolln. Before his great 'Erdbeschreibung,' which he began to publish in 1754 in separate volumes, and which, though not entirely completed by the author, passed through eight editions during his life, neither the Germans nor any other nation had a thoroughly scientific geographical work. Another of his important writings is the 'Magazin für Historiographie und Geographie' (1767-93).

Busenbaum, Hermann, hër'män boo'zën-bowm, German Jesuit: b. Notteln, 1600; d. Münster, 31 Jan. 1668. He taught moral philosophy at Cologne, and was rector of the Jesuit College at Münster. He is best known through his casuistical work, 'Medulla Theologiæ Moralis, Facili ac Perspicua Methodo Resolvens Casus Conscientiæ,' in which he treats of the principles of the Jesuit morals in a detailed and systematic manner. This book passed through 45 editions between 1645 and 1670, and has been reprinted in modern times. After Damiens' attempt to assassinate Louis XV. of France, the charge was made that it had taught the Jesuits' approval of murder and regicide; it was therefore publicly condemned by the order, and burned by the Parliament of Toulouse.

Busento, boo-sën'tō, a river of southern Italy, joining the Crati at Cosenza. The Goths, it is said, dug Alaric a secret grave in the bed of this stream, which they temporarily diverted from its course.

Bush, George, American biblical scholar: b. Norwich, Vt., 12 June 1796; d. Rochester, N. Y., 19 Sept. 1859. He graduated at Dartmouth College in 1818, and studied theology at Princeton, N. J., from 1820 to 1822. In 1831 he became professor of Hebrew and Oriental literature in the University of the City of New York. Embracing the doctrines of Swedenborg in 1847, he became a minister of the New Church and editor of the 'New Church Repository.' Among his works are a 'Life of Mohammed' (1832); a 'Hebrew Grammar' (1835); 'Bible Commentaries' (1840).

Bush-Brown, Henry Kirke, American sculptor: b. Ogdensburg, N. Y., 21 April 1857. He studied art in Paris and Italy, and has a studio in New York. His most important works are equestrian statues of Gens. Meade and Reynolds, at Gettysburg; the statue of Justinian, Appellate Court, New York; Indian Buffalo Hunt; Chicago World's Fair; statues for Hall of Records, New York.

Bush Creepers, the English name of the *Uncotillinae*, a subfamily of the *Sylviidae*. These birds have sharply conical bills and long, pointed wings. They are usually diminutive in size, active in habits, have a twittering note, and build their nests in thickets, solitary bushes, or trees. They are found in the warmer parts of both hemispheres, some of them, however, being migratory.

Bush-dog, a small wild dog (*Icticyon venaticus*), resembling a fox in appearance, found in Guiana and Brazil. It is distinguished by its one molar tooth in the upper jaw, has close hair, and a short, stubby tail. Compare FOX-DOG.

Bush-hog. See RIVER-HOG.

Bush-quail, the Anglo-Indian name for the button-quail (q.v.).

Bushbuck, any of several African antelopes, frequenting thickets and bushy regions. The name applies especially to the diminutive antelopes of the genus *Cephalotophus*, which the Dutch of South Africa called "duykers" (q.v.). These include the smallest members of their race, some of them standing only 13 inches high at the shoulders. They haunt the rocky hill-sides, leaping with extraordinary agility from stone to stone, and diving into the thickets at the first alarm. They feed upon berries, leaves, buds, and similar food, rather than upon grass, and their flesh has a delicate flavor. The name "bushbuck" is also given, especially in South Africa, to the larger antelopes of the genus *Tragelaphus*, more distinctively known as "harnessed" antelopes, because their hides, often richly colored, are conspicuously marked with whitish stripes, suggesting a harness thrown over the back. The largest of these handsome antelopes is the west African bongo (*T. euryceros*), of the forests of the Gaboon region, which stands nearly four feet high, and has horns 30 inches long. On the opposite side of the continent the nyala (*T. angasi*) frequents the fever-stricken swamps of the east African coast. Another well-known species of the swamps of southern and eastern Africa is Spekes antelope (*T. spekei*), native names for which are "nakong" and "situnga." It differs from its fellows in having a uniform grayish-brown silky coat, without any "harness," but the young are faintly striped and spotted. This species is one of the best known of African antelopes, wherever rivers or swamps occur, and still survives in considerable numbers. That species most often called "bushbuck" is the "guib" (*T. scriptus*), still to be found in the jungles along the African rivers from Abyssinia to the Cape. It is remarkable for its inferior size, which is about that of a goat; and for the variability of its markings, which has led to much confusion in describing it. The variety most common in Cape Colony is uniformly dark brown, with no stripes whatever, and only a few spots on the haunches. This genus of antelopes is closely allied to that of the koodoos (q.v.), and resembles them in that the females are hornless, and usually differ in color from the males.

Bushel, a dry measure containing eight gallons or four pecks. The standard bushel in the United States (originally known as the Winchester bushel) contains 2150.42 cubic inches and holds 77.627 pounds of pure water at a temperature of 39.8° F., and 30 inches atmospheric pressure. The English standard, the imperial bushel, has a capacity of 2218.20 cubic inches and holds 80 pounds of pure water at 62° F.

Bushido, boo-shē'dō ("the way of the warrior"), the ethical code of the Samurai, the Japanese order of knighthood. It is in some ways like the code of the knights of the Middle Ages, demanding courage, honor, and loyalty to country and rulers; it also enjoins the duty of suicide by hari-kari (q.v.) to avoid loss of honor. Although the formal code was given up when feudalism was abolished in Japan, its ideals still have great influence on the people,

BUSHIRE — BUSKIN

and many of the most prominent of the nation were educated according to its principles. See SAMURAI.

Bushire, boo'shēr. See ABUSHER.

Bushmaster, a large pit-viper (*Lachesis mutus*) of the rattlesnake family, numerous in northeastern South America, and called by the natives "surucucu." It is the largest and most venomous snake known, sometimes reaching a length of nine feet. Its ground color is pale yellow, darker on the back, and marked with a chain of jagged brown spots, and lighter on the belly. It has no rattle, but its tail terminates in a horny spur, which when the tail is vibrated, strikes against the ground, producing a rattling noise, which can be heard several feet. It is similar to the rattlesnake in its habits, dwells wholly upon the ground, and its poisonous apparatus is greatly developed, making it a very deadly serpent, and one much feared.

Bushman, or **Bosjesmans**, a dwarf African race inhabiting the Kalahari desert and some of the more northerly portions of Cape Colony. Their average height seems to be rather less than five feet, but the Bushmen of the Cape are more stunted than those living farther north. The skin is of a dirty yellowish color, and they have repulsive countenances, with a somewhat prominent forehead, thick lips, large ears, and small, deep-set, restless eyes. They are essentially a nomadic people, neither tilling the soil nor rearing domestic animals, but subsisting on the flesh of various wild animals, and on wild bulbs, roots, fruits, etc. They live in rocky caves or in rude nest-like structures in a bush or bosje, whence their ordinary Dutch and English names. Their language is a combination of chattering, hissing, and grunting nasal sounds, with peculiar clicks. They possess powers of mimicry, and many colored drawings of men and animals on rocks, etc., show some artistic sense. They have a collection of folk tales, dealing mostly with animals.

Bushnell, **Horace**, American theologian: b. Litchfield, Conn., 14 April 1802; d. Hartford, 17 Feb. 1876. He graduated at Yale in 1827, engaged in journalistic and educational work, then studied law and theology at Yale, where for a time he was a tutor, and in 1833 he began his brilliant pastorate of the North Congregational Church in Hartford, from which he retired owing to failing health in 1853. His writings on theological subjects were as remarkable for the interest and discussion which they aroused among religious scholars and thinkers as for their originality and independence of thought and vigor of utterance. Both as writer and preacher he was a commanding figure, and his influence was far-reaching. His works include: 'Principles of National Greatness; Christian Nurture' (1847); 'God in Christ' (1849); 'Christian Theology' (1851); 'Sermons for the New Life' (1858); 'Nature and the Supernatural' (1858); 'Character of Jesus' (1861); 'The Vicarious Sacrifice' (1865); 'Women's Suffrage, the Reform Against Nature' (1869); 'Forgiveness and Law' (1874). See Mary B. Cheney, 'Life and Letters of Horace Bushnell' (1880); T. T. Munger, 'Horace Bushnell, Preacher and Theologian' (1899). The public services of Dr. Bushnell as a citizen were such as to make him long remembered for his civic pride and devotion to the interests of the city

where his lifework was performed. Bushnell Park, Hartford, named in his honor, is a monument to his initiative and persistent efforts, whereby mainly the city came into possession of one of its chief adornments.

Bushrangers, the name for desperadoes in Australia who, taking to the bush, supported themselves by levying contributions on the property of all and sundry within their reach. Considerable gangs of these lawless characters have sometimes collected, a body of 50 holding part of New South Wales in terror about 1830. A gang of four fell victims to justice in 1880, after having robbed a bank and committed other outrages. Since then little has been heard of outrages of this class.

Bushtit, a very small titmouse of the genus *Psaltiriparus*, two species of which inhabit the western United States. One, the least bush-tit (*P. minimus*), is found in summer from the Rocky Mountains to the Pacific coast, and is noted for its nest, which is formed of moss, down, lint of plants, and similar materials, and is shaped like an old-fashioned purse, 8 or 10 inches in length, suspended from the branch of a bush, and entered by a small hole near the top. The lining is of feathers and downy materials, and the eggs are 8 to 10 in number, and pure white. A southern variety of this is the lead-colored bushtit. A Mexican species (*P. melanotis*) is distinguished by black patches on each side of the head. The resemblance in the nesting habits of these birds to those of the European titmouse will be noted. See TITMOUSE.

Bushwhacker, a term applied during the Civil War to men living in the States where military operations were carried on, who professed to be neutrals and to be solely occupied in their ordinary vocations, but who seized opportunities to harass or attack individual soldiers or small bodies off their guard.

Busi'ris, a mythical Egyptian king mentioned by Apollodorus. Egypt had been for nine years subject to famine when Phrasius, a soothsayer of Cyprus, arrived to inform the king that the scarcity would not cease unless a foreigner were sacrificed each year to Zeus. Busiris made Phrasius the first victim, and established the custom of immolating a foreigner every year. Hercules was one year seized and bound to the altar, ready to be offered up, when he burst his chains and put Busiris to death.

Busk, **George**, English scientist: b. St. Petersburg, 1807; d. 1886. In the early part of his career he served as surgeon in the British navy, retiring in 1855. Later he devoted himself to the study of geology, paleontology, and kindred sciences, and became an authority in certain departments of zoology. He was a Fellow of the Royal Society and of the Geological Society of London.

Buskin (Latin *cothurnus*), a kind of high-soled shoe or half-boot, worn upon the stage by the ancient actors of tragedy, in order to give them a more heroic appearance. The Greek word *kothornos* denoted a sort of closed boot, fitting either foot, worn by women; the tragic boot being the *embates* or *embas*. The word is figuratively employed by the Latin authors for tragedy itself, or for a lofty and elevated style.

BUSSANG — BUSTARD QUAIL

Bussang, boo'sǎng, or **Boussa**, a town of central Africa in lat. 10° 14' N.; lon. 4° 11' E. It is walled, and being surrounded by rocks is a place of considerable strength. The houses are irregularly placed, and thus cover a space of ground disproportioned to the number of inhabitants. The soil of the country is fertile, producing corn, yams, cotton, rice, and timber trees in great abundance. Among the wild animals are elephants, hippopotami, lions, etc. It has obtained a melancholy notoriety from the place where Mungo Park met his death in 1805. Pop. estimated at 12,000 to 18,000.

Bussey, Benjamin, American merchant: b. Canton, Mass., 1 March 1757; d. Roxbury, 13 Jan. 1842. He was a soldier in the Revolutionary War, became a silversmith in Dedham, afterward a merchant in Boston, where he acquired a large property, from which he bequeathed about \$350,000 to Harvard College, one half for founding the Bussey Institute, a school of agriculture and horticulture, and one half for the support of the law and divinity schools of the college.

Bussi D'Amboise, Louis de Clermont D'Amboise, loo-ē de klēr-mōn dan-bwa bu-sē dan-bwa (SEUR DE): b. 1549; d. 19 Aug. 1579. He acquired an infamous notoriety by the prominent part he took in the massacre of St. Bartholomew. He afterward attached himself to the Duke of Anjou, and obtaining the command of the castle of Anjou, made himself universally odious by his pride and oppression. He had the meanness to pander to the low passions of the Duke, and undertook to seduce the wife of the Count of Montsoreau. The intrigue cost him his life. Montsoreau having come to the knowledge of it, obliged his wife to write Bussi, giving him a rendezvous at the castle of Constançières. Bussi arrived with a single confidant, and was immediately met by Montsoreau, who killed him.

Busson, Charles, shārl bū-sōn, French painter: b. Montoire, Loir-et-Cher, 15 July 1822. He studied under Rémond and François and devoted himself to landscape painting. His style was not marked by the characteristics of the "open air school," but recalled the canvases of earlier masters in his chosen branch of art. Among his paintings are 'Les Ruines du Château de Lavardin' and 'La Chasse au Marais.'

Bussu (būs-soo) Palm, a plant (*Manicaria succifera*), common in the swamps of northern Brazil. Though it rarely exceeds 15 feet in height, it has huge leaves, said to be the largest undivided leaves produced by any palm, even reaching 30 feet in length by 4 or 5 feet in width. After splitting the midrib from end to end the leaves are laid obliquely upon rafters to form thatch for houses. This position makes the spaces between the veins act as gutters to carry off water. The spathes are used by the Indians for caps and bags and for cloth-making. The large, hard, three-seeded, olive-green fruits do not seem to be used commercially.

Bussy-Rabutin, bū-sē-ra-bū-tān, or Roger de Rabutin, COMTE DE BUSSY: b. Epiry, Nivernois, 1618; d. Autun, 1693. He entered the army at the age of 13, and made several campaigns. Turenne, in a letter to the king, describes him as the best officer in his army, as far as songs were concerned. His scandalous chronicle,

entitled 'Histoire Amoureuse des Gaules,' cost him the loss of his official appointment and a year's imprisonment in the Bastille. He was a correspondent of Madame de Sévigné, and is often mentioned in her letters. He had the vanity to suppose that he excelled her in her peculiar art, and his letters were afterward published in seven volumes.

Bust (French *buste*, Italian *busto*, of uncertain origin), in sculpture, the representation of that portion of the human figure which comprises the head and the upper part of the body. The bust did not become common among the Greeks until the time of Alexander, nor among the Romans till the time of the empire. Among the Greeks, the portrait busts of the learned formed an important branch of art. The artists in these works exhibited a singular power of expressing character, and in this way we possess what are probably faithful likenesses of Socrates, Plato, and other distinguished persons. The first Roman bust that can be depended upon as giving a correct likeness is that of Scipio Africanus the elder. The number of busts of the time of the Roman empire is very considerable, but those of the Roman poets and men of letters have not been preserved in so large numbers as those of the Greeks. A collection of drawings of antique busts was made by Fulvius Ursinus, and published with the title, 'Virum Illustrium Imagines' (Rome 1569; Antwerp 1606); subsequently a similar collection was published in the 'Iconographie Grecque' of Visconti (Paris 1811), which was followed by his 'Iconographie Romaine' in 1817.

Bustamante, boo-sta-mán'tā, Anastasio, Mexican statesman and revolutionist: b. Tiquilpan, Michoacan, 27 July 1780; d. San Miguel Allende, 6 Feb. 1853. In 1808 he joined the Spanish army, and for a time fought against the party of the revolutionists, but in 1821 he acted with Iturbide. He was made vice-president and commander of the army, in the administration of Guerrero, 1829. He afterward revolted and led the Centralist party, and in 1830 became acting president of Mexico. In 1832 Santa Anna opposed him at the head of an army, and he was conquered and banished 1833. When the Centralist party returned to power he was recalled, and in 1837 was elected president of Mexico. In 1842 he was obliged to retire from the presidency, and was succeeded by Santa Anna. He served in the Mexican army in the war with the United States, retiring from military service in 1848.

Bustamante, Carlos Maria, cār'lōs mār-ē'a, Mexican historian: b. Oajaca, 4 Nov. 1774; d. 21 Sept. 1848. He studied law and in 1801 began his practice. In 1805 he became editor of the *Diario de Méjico*. He held a command under Morelos in 1812, and was captured at Vera Cruz. He was released, and became a member of Congress and held other public offices. His works treat of various periods of Mexican history, and are of special value, as he was an eye-witness of much that he describes. He published a history of the Mexican Revolution (1823-32), and histories of the times of Iturbide and of Santa Anna.

Bustard Quail, the name given by Anglo-Indians to the button-quail (q.v.).

BUSTARDS.



1. Little Bustard

2. Great Bustard.

BUSTARDS—BUTE

Bustards, a family of game birds (*Otididae*) of the Old World, which, however, are not gallinaceous, but are related in structure on the one hand to the cranes, and on the other to the plovers. They are inland birds, haunting dry, grassy, and sandy plains, and in the more settled districts resorting to stubble-fields and pastureland. They have strong legs and feet, as well as good wing-power, and spend more of their time on the ground than in flight. Most of them are birds of handsome plumage, the upper parts being mottled with brown and reddish tints, set off with white and black. Ornamental plumes are characteristic of the group, and often form crests, or ruffs, about the head, neck, and breast. Bustards are known in the Mediterranean regions, and throughout southern Asia to China and Japan. They also abound all over Africa, and one species (*Eupodotis australis*) inhabits Australia, where it is called "native turkey." Those of North Africa and western Asia are known as "houbaras," and form the favorite game-birds of that semi-desert region. Certain small species of India, favorites with sportsmen, are called "floricans." The typical, and best-known bustard, however, is *Otis tarda*, now extinct in Great Britain, but numerous throughout the Mediterranean countries. It has somewhat the size and form of an American turkey, and is the largest and one of the most valuable of European game-birds. A remarkable feature of this species is the fact that a great pouch, opening under the tongue, is developed in the throat of the male of some examples during the breeding season. This phenomenon is restricted to adult birds, and the pouch disappears at other times of the year. Its utility is unknown. A much smaller but otherwise similar species, the little bustard (*Otis tetrax*), is another favorite with European sportsmen. The term is sometimes erroneously applied to other large birds, such as the Magellanic goose of Argentina. Consult: Aflalo, 'Sport in Europe' (London 1901); Seebohm, 'Birds of Asia' (London 1901); Bryden, 'Nature and Sport in South Africa' (London 1897).

Busybody, The, a pen name under which Benjamin Franklin wrote a series of papers, modeled on 'The Spectator' of Addison; also a comedy by Mrs. Centlivre, 1709.

Bu'tades. See DIBUTADES.

Butch'er, Samuel Henry, Irish classical scholar: b. Dublin, 16 April 1850. He was educated at Marlborough College, and Trinity College, Cambridge, and was a lecturer at University College, Oxford, 1876-82. In the last mentioned year he succeeded John Stuart Blackie as professor of Greek in the University of Edinburgh. He has published a 'Prose Translation of the Odyssey (with A. Lang q.v.) (1879); 'Demosthenes' (1881); 'Some Aspects of the Greek Genus' (1891); 'Aristotle's Theory of Poetry and the Fine Arts, with a Critical Text and Translation of the Poetics' (1895).

Butcher. See ABATTOIR.

Butcher-bird, a shrike of the family *Laniidae*, representatives of which range throughout the northern hemisphere. They are birds of moderate size, and gray and white in color, with black markings upon the head, wings, and tail, which are properly included among the insect-eating birds, but have developed certain falcon-

like traits. They are of powerful build, with hooked beaks, and strong claws, and in winter, when insect prey is not easily obtained, they are accustomed to strike down small birds, and to seize mice, shrews, etc. These they carry off in their claws to some thorn-tree, or to a fence with spikes, and impale them one by one upon the thorns, or other sharp points, in order to lift them firmly while they feed upon their flesh. It often happens, however, that their love of the chase exceeds their appetite, so that they will catch and store away several victims, whose frozen bodies remain hanging upon the thorns, like meat in a butcher's shop; the Germans have a popular belief that nine victims are thus stored at a time, and call the birds "nine-killers." These shrikes make rude nests in trees and lay four or five brownish spotted eggs. They feed their young upon insects, and these form the larger part of their own fare, especially grasshoppers. A typical species, common all over northern North America is the great northern shrike (*Lanius borealis*), which is rarely seen in the United States, except in winter. Another species, the loggerhead (*L. ludovicianus*), dwells in the southern States and is somewhat smaller in size. Consult: Ingersoll, 'Wild Life of Orchard and Field' (1902). See SHRIKE.

Bute, büt, John Patrick Crichton-Stuart, (3d MARQUIS OF) b. Mountstuart, 12 Sept. 1847; d. 9 Oct. 1900. He was educated at Harrow and Oxford. In 1872 he married a daughter of Lord Howard. He was mayor of Cardiff in 1891-2, and after the latter year was lord-lieutenant of Buteshire. From 1892 to 1898 he was lord rector of St. Andrew's University. He was the author of 'Early Days of Sir William Wallace'; 'The Burning of the Barns of Ayr'; and 'Altus of St. Columba.' He owned some 117,000 acres of landed property. In 1868 he joined the Roman Catholic Church and some years later published a translation of the Roman 'Breviary.'

Bute, John Stuart (3d EARL OF), British statesman: b. Edinburgh, 25 May 1713; d. 10 March 1792. His grandfather was created a peer in 1703, and the family was connected with the royal Stuart line. In 1737 he entered Parliament. In consequence of his opposition to the measures of the ministry was left out when a new Parliament was convened in 1741. Offended by this neglect, Bute retired to his estates, and lived there, wholly secluded, till the landing of the Pretender in Scotland in 1745 induced him to go to London, and offer his services to the government. He had attracted the notice of the Prince of Wales. He soon gained influence, and succeeded in making himself indispensable to the prince. At his death, in 1751, he was appointed, by the widowed princess, chamberlain to her son, and was intrusted by her with his education. Bute never lost sight of his pupil, and possessed so much more influence with the Princess of Wales than her son's particular tutors, the Earl of Harcourt and the Bishop of Norwich, that they resigned their offices. George II. died 25 Oct. 1760, and two days after Bute was appointed member of the privy council. In March 1761 the Parliament was dissolved, and Bute was made secretary of state. Pitt, who saw his influence in the new council annihilated, gave in his resignation the same year. This event made an unfavorable impression on the

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nation; but Bute, possessing the unbounded confidence of his king, stood at the head of the state. After a severe contest in Parliament, he concluded a peace with France. The terms for England were perhaps not disproportionate to the successes obtained during the war; but Bute was obliged to bear the most bitter reproaches. He, however, succeeded in winning the popular favor, and everything seemed to promise the power of the minister a long continuance. The influence of Bute seemed unbounded, when it was made known, contrary to expectation, that he had resigned his office as prime minister, and was in future to live as a private man. In 1766 Bute declared in the House of Lords that he had wholly withdrawn from public business, and no longer saw the king; still it was not doubted that his great influence continued. On the death of the Princess of Wales, 1772, he seems first to have given up all participation in the affairs of government. He spent his last years on his estate. A costly botanical garden, a library of 30,000 volumes, excellent astronomical, philosophical, and mathematical instruments, afforded him occupation. His favorite study was botany, with which he was intimately acquainted. For the queen of England he wrote the 'Botanical Register,' which contained all the different kinds of plants in Great Britain (9 vols. 4to). This work is remarkable, both for its splendor, in which it excels all former botanical works, and for its rarity. Only 12 copies were printed, at an expense of more than \$50,000.

Bute, an island of Scotland, in the estuary of the Clyde, with an area of 30,000 acres, belonging principally to the Marquis of Bute. It is about 15 miles long, and the average breadth is $3\frac{1}{2}$ miles. Agriculture is in an advanced state, and there are about 20,000 acres under cultivation. The herring fishery is also a source of considerable profit. The only town is Rothesay, whose ancient castle is one of the interesting antiquities of the island. The climate of Bute is milder than that of almost any part of Scotland. The county of Bute comprises the islands of Bute, Arran, Great Cumbrae, Little Cumbrae, Inchmarnock, and Pladda, with a total area of 143,997 acres, but only a small part is under cultivation. Arran is about double the size of Bute, but the other islands belonging to the county are small. Pop. (1901) 18,800.

Bu'tea, a small genus of trees or woody vines of the natural order *Leguminosæ*, natives of China and India, noted for their racemes of large rich usually scarlet papilionaceous flowers, for which they are cultivated in warm countries and to a small extent in warm greenhouses. The best-known species (*B. frondosa*) is called the dhak or pulas tree in India, and is grown out of doors in California. It is a leafy tree, attains a height of 50 feet, and bears very showy orange-crimson flowers, which are used in the East under the name keesoo or teesoo for dyeing yellow or orange. Its fibrous roots and bark are used for caulking boats, making rope, etc. Its red, resinous gum, with which the twigs are frequently covered, is said to be very rich in tannin, and is found in the markets of India.

Butin, Ulysse Louis Auguste, ü-lës loo-ê ò-goost bú-tân, French painter: b. St. Quentin, 1838; d. Paris, 9 Dec. 1883. He was a pupil of Picot and Pils. His subjects are mostly

from the life of the French fishermen, and his work shows remarkable truthfulness to nature. Among his best paintings are 'The Departure'; 'Fishing'; and 'Burial of a Sailor at Viller-ville.'

Butler, Amos William, American ornithologist: b. Brookville, Ind., 1 Oct. 1860. He received his education at the University of Indiana and in 1895 was elected president of the Indiana Academy of Science. He has been general secretary of the American Association for the Advancement of Science from 1891 and has published 'The Birds of Indiana' and lesser works.

But'ler, Andrew Pickens, American politician: b. Edgefield District, S. C., 7 Nov. 1796; d. near Edgefield Court-house, 5 May 1857. He was admitted to the bar in 1819, and in 1824 was elected to the legislature as the representative of his native district. In 1831, a period marked by the apprehended collision of South Carolina with the Federal government, on the nullification issue, he was elected colonel of a regiment of cavalry. In 1833, still a member of the legislature, he was made a judge of the courts of general sessions and common pleas. Subsequently, when a change was made in the judiciary system, he was transferred to the supreme bench of the State, where he continued until 1846, when he was elected a senator in Congress. Soon after taking his seat in this body, he was appointed chairman of the Judiciary Committee. One of his earliest speeches was against making Col Benton lieutenant-general of the army. The Kansas question, the action of the naval retiring board, the abolition question, and all others affecting the peculiar interests of South Carolina, and the general welfare of the South, engaged him in frequent debate, in which he always took a conspicuous part. His last speech was in reply to Mr. Sumner, and in defense of South Carolina.

Butler, Benjamin Franklin, American lawyer: b. Kinderhook Landing, N. Y., 17 Dec. 1795; d. Paris, France, 8 Nov. 1858. He was a lineal descendant of Oliver Cromwell. He studied law under Martin Van Buren, whose partner he subsequently became. From 1821 to 1825 he was district attorney of Albany County. He was elected to the Assembly in 1828, and from 1834 to 1838 was United States attorney-general. He was also acting secretary of war during part of Jackson's administration. He organized the law department of the College of the City of New York and for many years was one of the foremost members of the New York bar.

Butler, Benjamin Franklin, American lawyer and soldier: b. Deerfield, N. H., 5 Nov. 1818; d. Washington, D. C., 11 Jan. 1893. He studied law, was admitted to the bar in 1841, and beginning practice at Lowell, Mass., became distinguished as a criminal lawyer and politician. He was a member of the State legislature in 1853, of the State Senate in 1859-60, and a delegate to the Democratic National Convention of 1860, which met at Charleston and adjourned to Baltimore. He supported the nomination of John C. Breckenridge, which rendered him so unpopular in the North that he was defeated for governor of Massachusetts in that year. Butler had risen to the rank of brigadier-general of militia; and at the outbreak of the Civil War, he marched with the 8th Massa-

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chusetts Regiment, and, after a check at Big Bethel, was appointed to the command of Baltimore and of eastern Virginia, with his headquarters at Fort Monroe. In February 1862 he commanded the military forces sent from Boston to Ship Island, near the mouth of the Mississippi; and, after New Orleans had surrendered to the naval forces under Farragut, he held military possession of the city. Relieved of his command, he acted under Gen. Grant in his operations against Petersburg and Richmond in 1865. Returning to Massachusetts at the end of the war, he took an active part in politics as an extreme radical, advocated the impeachment of President Johnson, and in 1866-75 was a member of Congress. In 1877 and 1879 he was defeated as candidate for governor of Massachusetts, but in 1882 was elected by a large majority. In 1884 he ran for the presidency as the candidate of the Greenback and Anti-Monopolist parties, but was defeated, carrying no State. He published 'The Autobiography and Personal Reminiscences of Maj.-Gen. Benjamin F. Butler' (1892). Consult: Parton, 'Butler in New Orleans' (1863); Bland, 'Life of Benjamin F. Butler' (1879).

Butler, Charles, English Roman Catholic historian: b. London, 15 Aug. 1750; d. there, 2 June 1832. He was nephew of the Rev. Alban Butler (q.v.) He was called to the bar in 1791, and was the first Roman Catholic who was admitted, after the passing of the relief bill of that year. He wrote 'Horæ Biblicæ,' giving a history of the original text, early versions, and printed editions of the Old and New Testaments, and also of the 'Koran,' 'Zend-Avesta,' and the 'Edda.' This first appeared in 1797, and was followed by 'Horæ Juridicæ Subsecivæ,' a connected series of notes respecting the geography, chronology, and literary history of the principal codes and original documents of the Grecian, Roman, feudal, and canon law. He continued and completed Hargrave's 'Coke Upon Littleton'; supervised the sixth edition of Fearn's 'Essay on Contingent Remainders'; wrote a history of the geographical and political revolutions of Germany, and a 'Historical and Literary Account of the Formularies, Confessions of Faith, or Symbolic Books of Roman Catholic, Greek, and Principal Protestant Churches.' During the last 25 years of his career he principally devoted his pen to the vindication of the Roman Catholic Church. He published numerous biographies of eminent Roman Catholic divines and authors; continued his uncle's 'Lives of the Saints,' and produced 'Historical Memoirs of the English, Irish, and Scottish Catholics.' When Southey's ultra-Protestant 'Book of the Church' appeared, it was replied to in Butler's 'Book of the Roman Catholic Church,' which gave rise to six answers on the Protestant side, two of which were responded to by Butler. His 'Reminiscences' appeared 1822-7. As a constitutional lawyer his reputation was very high.

Butler, Charles, American lawyer: b. Kinderhook Landing, N. Y., 15 Feb. 1802; d. New York, 13 Dec. 1897. He was admitted to the bar in 1824 and subsequently as agent of the New York Life Insurance and Trust Company did much to help forward the development of the western part of the State. He was one of the

founders of the Union Theological Seminary in 1835 and was for many years president of the council of New York University.

Butler, Clement Moore, American Episcopal clergyman: b. Troy, N. Y., 16 Oct. 1810; d. Philadelphia, Pa., 5 March 1890. He was a graduate from Trinity College, Hartford, in 1833, and from the General Theological Seminary in 1836. He was successively rector of churches in Boston and Washington, D. C., and of Grace Church in Rome, Italy, and from 1864 to 1884 professor of ecclesiastical history in the Episcopal Theological School in Philadelphia. He was the author of 'The Book of Common Prayer Interpreted by Its History' (1846); 'Old Truths and New Errors' (1850); 'Saint Paul in Rome' (1865); 'Inner Rome' (1866); 'Manual of Ecclesiastical History' (1868-72).

Butler, Lady Elizabeth Southerden Thompson: b. Lausanne, Switzerland, about 1844; married, 1877, Sir William Francis Butler (q.v.). She received her education in Italy, came to England in 1870, and first exhibited at the Royal Academy in 1873. Her 'Roll-Call' (1874) gained her a great reputation, and was purchased by Queen Victoria. Among her other pictures, which deal almost exclusively with military subjects, are: 'Missing' (1873); '28th Regiment at Quatre Bras' (1875); 'Balacava' (1876); 'Inkerman' (1877); 'Defense of Rorke's Drift' (1881); 'Scotland Forever' (1881); 'Floreat Etona' (1882); 'The Charge of the Scots Greys at Waterloo' (1882); 'Evicted' (1890); 'Camel Corps' (1891); 'Halt in a Forced March' (1892); 'Dawn of Waterloo' (1895); 'Steady the Drums and Fifes' (1897); 'Tent Pegging in India' (1902). She is a sister of Mrs. Alice Meynell, the writer (q.v.).

Butler, Howard Russell, American landscape artist: b. New York, 3 March 1856. He graduated from Yale in 1876 and the Columbia Law School in 1881, and studied art in New York and Paris. He organized the American Fine Arts Society and was its first president.

Butler, James (DUKE OF ORMOND), English statesman: b. London, 19 Oct. 1610; d. Kingston Hall, Dorsetshire, 21 July 1688. When Strafford became lord-lieutenant of Ireland, Butler was made commander of the army, but as it consisted of only 3,000 men, he could do little more than keep the enemy in check, and was obliged to agree to a cessation of hostilities; after which, having been created a marquis, he was appointed lord-lieutenant. On the ruin of the royal cause he retired to France. After the execution of Charles he returned to Ireland with a view of raising the people; but on the landing of Cromwell returned to France. While abroad he exerted himself to further the restoration of Charles; and when that event was brought about by Monk, returned with the king. Before the coronation he was created Duke, and assisted at that ceremony as lord high-steward of England. In 1662 he was again appointed lord-lieutenant of Ireland, which country he restored to comparative tranquillity, and was an active benefactor to it by encouraging various improvements, particularly the growth of flax and manufacture of linen. On the exile of Lord Clarendon, his attachment to that nobleman involved Butler in much of the odium attached to him, and although, on his recall from Ireland, noth-

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ing, on the most rigorous inquiry, could be proved against him, he was removed by the machinations of Buckingham. For six years he was deprived of court favor, but at length was again appointed lord-lieutenant of Ireland, which place he held during the remainder of the reign of Charles, but soon after resigned, his principles not suiting the policy of James. He died at his seat in Dorsetshire, leaving behind him the character of a man who united the courtier and the man of honor and integrity better than any nobleman of the time.

Butler, John, American royalist leader in the American Revolution: b. Connecticut; d. Niagara, 1794. He became a leading resident of Tryon County, N. Y.; commanded the Indians in the Niagara campaign (1759) and in the Montreal expedition (1760). At the outbreak of the Revolution he sided with the Tories and became deputy superintendent of Indian affairs. In 1776 he organized a band of marauders, chiefly Indians, and fought the battle of Oriskany (1777); in July 1778, he commanded at the brutal Wyoming massacre. In 1780 he took part in Sir John Johnson's raid on the Mohawk settlements. At the end of the war he fled to Canada, and was appointed Indian agent.

Butler, Joseph, English prelate and theologian: b. Wantage, Berkshire, 18 May 1692; d. Bath, 16 June 1752. After some previous education at a grammar school he was sent to an academy at Tewkesbury, with a view to ordination as a minister among the Dissenters. While occupied by his studies he gave a proof of his talents by some acute and ingenious remarks on Dr. Samuel Clarke's 'Demonstration of the Being and Attributes of God,' in private letters addressed to the author. He likewise paid particular attention to the points of controversy between the members of the Established Church and the Dissenters, the result of which was a determination to be no longer a Nonconformist; he therefore removed to Oxford in 1714. Having taken orders, he was in 1718 appointed preacher at the Rolls Chapel, and the sermons which he preached while holding this office, especially the first three, 'On Human Nature,' occupy an important place in the history of ethical science. In 1736 he was appointed clerk of the closet to the queen. The same year he published his celebrated work, the 'Analogy of Religion, Natural and Revealed, to the Constitution and Course of Nature.' In 1738 Butler was promoted to the bishopric of Bristol on the recommendation of Queen Caroline; and in 1750 obtained his highest preferment—the bishopric of Durham. He was interred in Bristol Cathedral. His other published works include: 'Fifteen Sermons Preached at the Rolls Chapel' (1726); 'Six Sermons Preached Upon Public Occasions'; etc. The first collected edition of his works was published in 1804 at Edinburgh. An excellent edition of his famous 'Analogy' is that of Fitzgerald (1860). Mr. Gladstone brought out an edition of his works in two volumes (1896), and also published a volume of 'Subsidiary Studies on Butler.'

Butler, Josephine Grey, English reformer and philanthropist: b. Milfield, Gloucestershire, about 1828; married George Butler, afterward Canon Winchester, 1852. She has been prominent in efforts for the higher education of women, and for moral reform, and has published:

'Life of John Grey of Dilston'; 'Life of Catherine of Sierra'; 'Recollections of George Butler'; 'The Lady of Shunem'; 'Personal Reminiscences of a Great Crusade'; 'Prophets and Prophetesses'; 'Nature Races and the War'; 'Silent Victories'; 'The Hour Before the Dawn'; 'Government by Police'; 'The Constitution Violated'; 'Women's Work and Women's Culture'; 'Life of Oberlin'; 'A Voice in the Wilderness.'

Butler, Matthew Calbraith, American army officer: b. near Greenville, S. C., 8 March 1836. He studied law at Stonelands, near Edgefield Court-house, and was admitted to the bar in December 1857. He was elected to the legislature of South Carolina in 1860; entered the Confederate service as captain of cavalry in the Hampton Legion in June 1861, and became a major-general through the regular grades; lost his right leg at the battle of Brandy Station on 9 June 1863. He was elected to the legislature of South Carolina in 1866; was United States senator in 1877-95; commissioned a major-general of volunteers for the war with Spain, 28 May 1898; and was appointed one of the American commissioners to arrange and supervise the evacuation of Cuba.

Butler, Nicholas Murray, American educator: b. Elizabeth, N. J., 2 April 1862. He was graduated at Columbia University in 1882; took a special course in Berlin and Paris in 1884-5; and was then called to Columbia University, where he was an assistant in philosophy, 1885-6; tutor, 1886-9; and adjunct professor, 1889-90; and dean of the faculty of philosophy, 1890-2. He was a founder and the first president (1886-91) of the New York College for the Training of Teachers, now a part of Columbia University, and as member of the New Jersey State Board of Education (1887-95) introduced manual training into the public school system of that State. On 6 Jan. 1902 he was unanimously elected president of Columbia University to succeed Seth Low, then mayor-elect of New York. He has edited 'The Educational Review'; 'The Teachers' Professional Library'; 'The Great Educators Series'; 'The Columbia University Contributions to Philosophy and Education'; and the 'Monographs on Education in the United States,' which formed a part of the exhibit of the United States bureau of education at the Paris Exposition of 1900, and published a volume of miscellaneous essays, addresses, etc., entitled 'The Meaning of Education' (1898).

Butler, Samuel, English satirical poet: b. Strensham, Worcestershire, 12 Feb. 1612; d. London, 25 Sept. 1680. He passed some time in his youth at Cambridge, but never matriculated at the university. He was afterward clerk or steward to several country gentlemen, and latterly lived in London. He resided some time with Sir Samuel Luke, a commander under Cromwell. In this situation Butler acquired the materials for his 'Hudibras' by a study of those around him, and particularly of Sir Samuel himself, a caricature of whom constituted the celebrated knight Hudibras. The first edition of 'Hudibras' was published in 1663 and was brought under the notice of the court by the well-known Earl of Dorset. It immediately became highly popular with the prevailing party in Church and state, and served as a general



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source of quotation; the king himself perpetually answering his courtiers out of 'Hudibras.' Celebrated as it rendered its author, it did nothing toward extricating him from indigence. He was buried in St. Paul's Church, Covent Garden, at the expense of his friend, Mr. Longueville, of the Temple, and a monument was, 40 years after, erected to his memory, in Westminster Abbey, by Alderman Barber, the printer. 'Hudibras,' both in its style and matter, is one of the most original and witty works that were ever written. As a work intended to ridicule the Puritans its attraction was great but temporary, but as applicable to classes of character found in all ages, its satire will always be relished. Butler's 'Remains in Verse and Prose' appeared in 1759.

Butler, Samuel, English author and composer: b. Langar, 4 Dec. 1835; d. London, 19 June 1902. He was educated at Shrewsbury School and Cambridge University, and with Henry Festing Jones composed many gavottes, figures, etc., and the cantata of 'Narcissus.' He was also an artist of merit, and for several years exhibited at the Royal Academy. He is best known, however, as a brilliant, original writer in more than one field, and as a master of irony had few equals and still fewer superiors among his contemporaries, in this particular more nearly approaching Swift than anyone else. His published books include 'A First Year in Canterbury Settlement' (1863); 'Erewhon, or Over the Range,' his most remarkable work, with the exception of 'Erewhon Revisited'; 'Fair Haven,' an ironical defense of Christianity' (1873); 'Life and Habit' (1877); 'Evolution, Old and New' (1879); 'Unconscious Memory' (1880); 'Alps and Sanctuaries of Piedmont and the Canton Ticino' (1881); 'Luck or Cunning as the Means of Organic Modification' (1886); 'Ex Veto' (1888); 'Life of Dr. Samuel Butler of Shrewsbury and Bishop of Lichfield' (1896); 'The Authoress of the Odyssey' (1897); 'The Iliad of Homer, Rendered into English Prose' (1900); 'Erewhon Revisited' (1901).

Butler, William, American army officer: b. Prince William County, Va., 1759; d. Columbia, S. C., 15 Nov. 1821. He served in the Revolution in Pulaski's corps; afterward, under Pickens, Lee, and Greene; won fame as commander of the Mounted Rangers; and, after the war, became (1796) major-general of militia. He was a member of the Convention which adopted the Federal Constitution; helped frame the South Carolina constitution; was a member of Congress (1801-11); and commanded the South Carolina troops in 1812.

Butler, William Allen, American lawyer and man of letters: b. Albany, N. Y., 20 Feb. 1825; d. Yonkers, N. Y., 9 Sept. 1902. He was a son of Benjamin F. Butler (1795-1858, q.v.), and was graduated at the New York University in 1843 and began the practice of law. He wrote in 1857 'Nothing to Wear,' a satirical poem, which became famous almost immediately and was not only reprinted in England but translated into French and German. His other publications include a volume of his collective poems (1871); 'Mrs. Limber's Raffle' (1876); 'Oberammergau'; 'Domesticus' (1886).

Butler, Sir William Francis, British general: b. Tipperary County, Ireland, 31 Oct. 1838. He was educated at Dublin, and joined the army in 1858 as ensign in the 60th Regiment. In 1863 he became lieutenant, and in 1874 was promoted to the rank of major. He served on the Red River expedition of 1870-1, and about the same time was sent on a special mission to the Saskatchewan territories. He accompanied the Ashantee expedition in 1874, and in 1879 acted as staff officer in Natal. He also served in Egypt in 1882, and held important commands under Lord Wolseley in the Sudan campaign of 1884-5. From 1890 till 1893 he was in command at Alexandria, and in 1892 was raised to the rank of major-general. He has since had command of the 2d Infantry Brigade at Aldershot, and since 1896 of the southeastern district at Dover. He was made K.C.B. in 1886. In 1898-9 he was commander-in-chief of the forces in Cape Colony. He has published 'The Great Lone Land: A Narrative of Travel and Adventure in the Northwest of America' (1872); 'The Wild North Land' (1872), the story of a winter journey across northern North America; 'Akim-Foo' (1875), a story of the Ashantee war; 'Far Out' (1880); 'Red Cloud, the Solitary Sioux' (1882); 'The Campaign of the Cataracts' (1887); 'Charles George Gordon' (1889); 'Sir Charles Napier' (1891); and 'Sir George Colley' (1899). In 1877 he married Elizabeth Southerden Thompson the famous artist. See BUTLER, LADY ELIZABETH.

Butler, William Morris, American physician: b. Maine, 1850. He was educated at Hamilton College and the New York College of Physicians and Surgeons; has been professionally connected with several homœopathic hospitals, and has been professor of nervous diseases at the Metropolitan Postgraduate School of Medicine, New York. He has published 'Home Care for the Insane.'

Butler, William Orlando, American general: b. Jessamine County, Ky., 1791; d. Carrollton, Ky., 6 Aug. 1880. He was about devoting himself to the legal profession when the War of 1812 broke out. Enlisting as a private soldier in Capt. Hart's company of Kentucky volunteers he gained distinction in the battles at Frenchtown and the river Raisin. Subsequently he took a conspicuous part in the battles of Pensacola and New Orleans, was brevetted major, 23 Dec. 1814, acted as aide-de-camp to Gen. Jackson from 17 June 1816 to 31 May 1817, when he tendered his resignation, resuming for the next 25 years the profession of the law. From 1839 to 1843 he served as a representative in Congress from that district, in the interests of the Democratic party. Nominated as a candidate for governor of Kentucky in 1844, he was defeated by the influence of Clay. Created major-general, 29 June 1846, he led with great spirit the daring charge at Monterey, and although wounded on that occasion, still remained for several months with the army. On 18 Feb. 1848, he succeeded Gen. Scott in command of the army in Mexico. The most important operation during his tenure of this office was the defeat of Padre Jarauta and his guerrilla forces by Gen. Lane. His military administration in Mexico was brought to a close on 29 May 1848, when he announced the ratification of the treaty of peace. After his return

to the United States he was nominated in 1848 by the Democratic party as candidate for the vice-presidency. He was the author of 'The Boatman's Horn and Other Poems.'

Butler, Zebulon, American military officer: b. Lyme, Conn., in 1731; d. Wilkesbarre, 28 July 1795. He served in the French and Indian war, and in the Revolutionary War also. He commanded the garrison at Wyoming Valley at the time of the massacre of 3 July 1778.

Butler, Pa., a borough and county-seat of Butler County, situated on the Connequessing Creek, and on the Pennsylvania, the Pittsburg & W., the Buffalo, R. & P., and the Bessemer & L. E. R.R.'s. It is the centre of a region having oil and natural gas. The chief industry is glass manufacture, and there are also flouring mills, a large planing mill, and several oil-well supply manufactories. Pop. (1900) 10,853.

Butler University, a co-educational (non-sectarian) institution in Irvington, a suburb of Indianapolis, Ind.; organized in 1855 as Northwestern Christian University. In 1903 it had 25 professors and instructors, and 306 students.

Bu'to, an Egyptian goddess whom the Greeks identified with Leto or Latona. She was represented under the guise of a serpent, and the city of Buto, which took its name from her, is supposed to have occupied a site on an island in the modern Lake Burlos in the Delta of the Nile.

Buton, boo'tón, **Boeton**, or **Butung**, an East Indian island, southeast of Celebes, belonging to Holland. Its area is about 1,700 square miles. It is fertile and densely wooded, and is governed by a native chief, subject to the Dutch government. The population, mainly Malays, is about 100,000. The chief town is Buton at the southwestern end of the island.

Bütschli, büt-shlê, **Otto**, German zoologist: b. Frankfurt-on-the-Main, 1848. Since 1878 he has been professor of zoology in the University of Heidelberg. He was one of the first to establish knowledge of nucleus and cell division, and his writings upon protoplasm and bacteria have been widely read and discussed. He has published 'Protozoen'; 'Untersuchungen über mikroskopische Schäume und das Protoplasma' (1892); 'Untersuchungen über die Mikrostruktur künstlicher und natürlicher Kieselsäuregallerten' (1900).

Butt, Clara, English contralto singer of note: b. Southwick, Sussex, 1 Feb. 1873. She was educated at the Royal College of Music, and made her début at Lyceum Theatre, London, on 5 Dec. 1892, in the opera 'Orfeo.' She has taken part in three Handel festivals, and ranks among the very first of contralto singers. She was married to Mr. Kennerly Rumford in June 1900.

Butt, Isaac, Irish politician; the first to make political use of the phrase "Home Rule"; was the son of a Protestant rector: b. County Donegal, 16 Sept. 1813; d. 5 May 1879. Educated at Raphoe and at Trinity College, Dublin, he gained a brilliant reputation for his accomplished scholarship. In 1852 he was elected to Parliament as a Liberal Conservative for Youghal, for which constituency he sat until 1865. He defended Smith O'Brien and others in the state trials of 1848, and, with equal fearless-

ness and self-devotion, all the Fenian prisoners between the years 1865 and 1869. In 1871 he was elected for the city of Limerick to lead the Home Rule party. He published 'History of Italy' (1860); 'The Problem of Irish Education' (1875); and edited the 'Dublin University Magazine' (1834-8).

Butte, büt, Mont., a city and county-seat of Silverbow County, on the Great N., the Northern P., the Union P., and other railroads. It is the largest mining town in the world, employing over 10,000 persons in this industry alone, which is principally confined to copper mining, although there are valuable gold and silver mines. The Anaconda copper mines are located here, the copper production being about one half that of the United States. No considerable city in the country, perhaps, is so exclusively given over to a single commanding industry as Butte. There is virtually nothing here but mining. Every inhabitant is either connected directly with the mines or indirectly by catering to the miners. Most western towns, even though devoted to mineral interests, are in some degree centres for sheep, cattle, or agricultural industries. Butte has none of these interests. Virtually no green thing of any sort grows anywhere in or around Butte. This condition is due, in part, to the natural aridity of the soil, in part to the altitude, but chiefly to the fumes from the smelters. Even the trees which once covered the mountains have mostly disappeared, leaving everywhere the rough, scarred, barren earth. The city is the trade and jobbing centre for southern and western Montana; has an extensive trolley system; gas and electric lights; two national banks; public library; and several daily and weekly papers. It is governed by a mayor, biennially chosen, and a city council. Pop. (1900) 30,470.

Butte, a French word used in the United States for an abrupt, and usually isolated, eminence, sometimes appearing in the form of a lofty turret. Buttes occur in picturesque grandeur along the banks of the Columbia River, in Oregon, and in the neighborhood of Butte, Mont. The name is occasionally applied to mountain ranges.

Butter (M.E., *butter*; A.S., *butare*; L. *butyrum*; Gr. *βοτύρον* butter, from *βοῦς*, cow + *τύρος* (cheese), a product of milk, consisting largely of butter-fat and usually obtained by churning cream or milk, and working the product to remove water and other constituents.

Butter has been in use from early historic days. It is first mentioned in the Bible in Gen. xviii. 8. It was used as food and medicine, as an ointment, and for burning in lamps. The Greeks probably learned of it from the Scythians or Thracians, and the Romans from the Germans. It was made from the milk of sheep and goats, and later of cows, the method of making being to churn it in skin bags or pouches. Formerly butter was prepared by direct churning of the milk; this was both laborious and wasteful of butter-fat. To reduce labor and loss the system of setting the milk and skimming off the cream was evolved; since 1877 this method has given way to the use of centrifugal force for the separation of the cream and milk.

To-day the process of making is divided into the operations of creaming, churning, working,

BUTTER

and finishing. The fat exists in the form of small globules in the milk, in suspension. In the setting system the milk was placed in shallow pans about four inches high, or in deep ones of about 18 inches, and advantage was taken of the fact that the fat globules, being lighter than water and other constituents of the milk, would rise to the surface by the force of gravity. Large fat globules will rise more rapidly than small ones, and the size of the globules varies with different breeds of cattle. In the shallow-pan system the milk is set as soon as possible after it is drawn, and the cream is skimmed off in 24 or 36 hours. This system is wasteful in that the skim milk often contains 0.5 to 1.5 per cent of fat. The deep-setting system is less wasteful, the fat in the skim-milk being often reduced to 0.2 per cent. The new-drawn, warm milk is placed in cans surrounded or submerged in water at about 40° F., and the rapid reduction in temperature causes the globules to rise quickly. The cream is removed by dipping it off, or the skim-milk is drawn off from the bottom of the can. The fat left in the skim-milk consists of the small fat globules.

The introduction of the separator and use of centrifugal force has resulted in a more perfect and rapid separation. This force exceeds that of gravity a thousand-fold. The system of separation is continuous, a constant, uniform flow of milk being conducted into a bowl or drum revolving at from 5,000 to 9,000 or more revolutions per minute. The inlet tube is in the centre of the bowl and reaches almost to the bottom; here the constituents in the milk separate, the heavier serum gravitating to the circumference of the bowl, the fat—the lightest portion—remaining in the centre. These are forced upward by the incoming milk, and the separated milk escapes through a side tube, while the cream passes through a small outlet in the centre. This last outlet can be closed or opened in some machines, thus regulating the percentage of fat in the cream. The machines are of various sizes, from those worked by hand power and doing 200 to 500 pounds of milk per hour, to power machines of 2,000 pounds and over per hour capacity. Some makes have appliances within the bowl to increase the efficiency. A good separator, well run, will not leave more than from 0.05 to 0.1 per cent of fat in the separated milk.

The cream may be churned at once if sweet cream butter is desired, or "ripened" or soured. The aim in ripening is to develop certain flavors in the butter, and a certain degree of acidity which aids in churning and influences the texture. In this latter case cream should be cooled as it leaves the separator; if it is to be churned next day the temperature of cooling should be 65° to 70° F. If the second day, 55° to 60° F.; and if four days or more, 40° F. It should then be held at such temperature that it will reach the desired degree of acidity by the time it is desired to churn. The degree of acidity may be determined by various tests. Ripening may be effected by adding to the cream a "starter" of sour cream, sour milk, buttermilk, or a commercial preparation of the desired organisms or bacteria. In any case only desirable organisms should be permitted in the ripening room, as undesirable ones rapidly affect flavor. In some cases it is considered advisable to pasteurize the milk or cream,

the milk being heated to kill all germs, then the sample may be inoculated with desirable ones. During ripening the cream is usually held constant at a temperature between 60° and 70° F. until ready to churn.

In churning, the fat globules receive such agitation that they unite into masses. This is usually done in a churn (q.v.) and at a temperature ranging from 50° to 65° F. It is wise to churn at as low a temperature as possible, the best results being obtained at such a degree that the particles of fat unite readily, and, when united, form firm granules of butter. Churning should stop when the particles are the size of wheat. The buttermilk may be drawn off and the butter washed; it is then worked, either by hand or by the butter-worker (q.v.), to remove buttermilk, water, etc., salted, and packed as required.

Scrupulous cleanliness and attention to detail, from the feeding of the cows to the placing of the product in the hands of the consumer, are imperative. See CREAMERIES; DAIRYING.

The composition of butter varies, but is approximately: Fat, 85 per cent; protein, 1 per cent; ash (salt), 3 per cent; water, 11 per cent. The percentage of fat should not fall below 80 per cent, nor the water rise above 15 per cent. The percentage of fat in butter of good quality often rises to 86 or 88 per cent. The water content is the most variable, running up to 25 per cent, and in some cases higher. The fats of butter are glycerides of fatty acids. About 15 per cent of the fats are volatile, and at least in some cases aid in giving flavor and odor. Oleine, palmitine, and myristine are the three leading fats present; the former, being fluid at ordinary temperatures and variable in amount, influences the hardness of the butter. The quality of butter is judged by its flavor, texture, color, amount of salt, and general appearance. Flavor counts about 45 per cent of the points, and varies with the market. Some markets require a mild, delicate butter; for the supply of such the cream is often pasteurized; others require a high flavor, almost verging on rancidity. Whatever is desired, that flavor should be pronounced, with an absence of rancidity or other flavors. Texture carries 25 per cent of the points and depends upon the granular condition of the fats. The more distinctly the granules show up when the butter is broken the better the texture. The right color depends upon the market requirements; usually a bright golden yellow, as naturally yielded when cows are on grass, is considered ideal. It should be uniform. To ensure this, it is sometimes necessary to use some butter-color; formerly the main one used was arnotto; now the coal-tar colors, aniline yellow, and butter yellow, are used, although turmeric, saffron, carrot-juice, or marigold leaves would do. The coloring matter is usually dissolved in some oil, and the preparations are of standard strengths. Some South American countries require the butter to be a deep orange or red color. A small quantity of salt is often added to improve the palatability; it has little influence on the keeping qualities. The amount varies with trade requirements. Unsalted or slightly salted butter is largely used in Europe and the United Kingdom. The finish and packing of the butter should be attractive and neat. The styles are numerous, but attempts are being made to stan-

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dardize. The American butter-tub is largely used here. It holds from 50 to 70 pounds. In Canada and Australia a box holding 56 pounds is used for the export trade. The Danes ship their butter in firkins containing 112 pounds. For local trade the standard rectangular pound print is $4\frac{5}{8} \times 2\frac{1}{2} \times 2\frac{3}{8}$ inches. These are wrapped in parchment paper and packed in specially made boxes.

Oleomargarine is the most common adulterant, and its detection, especially when present in only small amounts, is difficult. Cottonseed and other oils have been used. Glycogen has been added to increase the water-holding capacity of the butter, and in butters for South America glucose has been added as a preservative. The various preservatives, as borax, boracic acid, etc., sold under their own and other names, are now recognized as adulterants.

Renovated or process butter is generally low-grade butter which has been melted and put through a process to remove the disagreeable odors and taste; sometimes it is then mixed with soured separated or whole milk or cream, and granulated. If the primary article is not too inferior, the resulting product can be sold as good creamery butter; generally its keeping qualities are impaired. In some States and in the United Kingdom all butter so treated must be distinctly branded "Renovated."

During the year 1850 the amount of butter made on farms in the United States was 313,345,306 pounds. In 1899 that made on farms and in factories was 1,491,871,673 pounds. Over two thirds of the butter is made on the farms, but the factory system is increasing. The average value of that made on farms was 16.7 cents per pound, and that made in creameries and factories 20 cents. The cost of transporting the milk to factories is about 1.5 cents per pound of butter. Denmark is at present the leading butter-exporting country of the world, with a record in 1898 of 160,143,255 pounds, valued at \$34,575,634, the average price being the highest on the market.

The coefficient of digestibility of butter-fat is 98 per cent or over. It is well assimilated, and, like other fats, is a source of heat and energy. Its value as a food and methods of usage are well known. Butter containing 82.4 per cent butter-fat has a fuel value per pound of 3,475 calories, and in a number of dietary studies butter furnished 1.9 per cent of the total food, and 19.7 per cent of the total fat of the daily food. Further information is given in Prof. Atwater's reports on dietary studies. Fresh and salt butter are equally valuable. Clarified butter is used in cooking. It is ordinary butter freed from casein and water by heating.

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S. FRASER,
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Butter, Artificial. See OLEOMARGARINE.

Butter and Eggs, a troublesome weed. See TOADFLAX.

Butter-bur (*Petasites vulgaris*), a composite plant, with large rhubarb-like leaves and purplish flowers, growing by the side of streams, allied to colt's-foot. The flowers appear before the leaves.

Butter-color, a preparation employed to color butter and its imitations. Annatto was formerly largely used for this purpose, but is now superseded by coal-tar colors and other coloring substances. Owing to the small quantities used in coloring butter they are quite harmless.

Butter-fishes. The two best known butter-fishes in American waters are denizens of the Atlantic. One (*Poronotus triacanthus*) is the butter-fish or dollar-fish of the coast of Massachusetts and New York, the harvest-fish of New Jersey, the dollar-fish of Maine, the sheepshead of Cape Cod, the pumpkinseed of Connecticut, and the star-fish of Norfolk. It swims mostly in company with large jellyfish, whose streamers, while often protecting it from other depredators, are frequently the cause of its death from their stings. The body is ovate and flat, the dorsal and anal fins are each very pointed, and the tail is long and widely forked.

The harvest-fish (*Peprilus paru*) is another "butter-fish" found from Cape Cod southward to Brazil, but it is most abundant about the mouth of Chesapeake Bay, where it is locally called "whiting." It has the habit of swimming beneath the Portuguese man-of-war. It is a delicious little pan-fish, about six inches long. On the Pacific coast there are three species, one of which (*P. similima*) is the Californian "pompano," abundant during summer about Santa Cruz, where it is highly prized for its rich and delicate quality, and reaches 10 inches in length. Consult: Jordan and Evermann, 'American Food and Game Fishes' (1902).

Butter Making. See BUTTER.

Butter, Rock. See ROCK BUTTER.

Butter-tree, various tropical or subtropical trees of different genera and even families. Their seeds yield fixed oils which resemble butter and are similarly used or are employed for lighting. The leading group is perhaps the genus *Bassia* of the natural order *Sapotacea*. Of this genus the best-known species are *B. longifolia*, the Indian oil-tree, whose wood resembles teak, and is in use in the East; *B. butyracca*, the Indian butter-tree, whose light wood is of no commercial importance; and *B. latifolia*, the East Indian Mahowa, Mahwa, or Madhuca. Beside the oil obtained from each of these trees, *B. butyracca* yields an edible fruit, and the corollas of *B. latifolia* are either eaten raw or are used for making a liquor or for distilling their essential oil. *Butyrospermum Parkii*, formerly referred to the genus *Bassia*, is the butter-tree of central Africa. It yields the galam or shea butter, obtained by boiling the seeds, which is locally an important article of commerce. The oil is obtained by boiling the kernels of the sun or kiln-dried seeds in water. It possesses long-keeping qualities. Various species of the genus *Caryocar* (q.v.), natives of South America, are known as butter-trees.

Butter-worker, a machine designed to unite the small particles of butter, remove the buttermilk and water, and incorporate the salt,

BUTTERFLIES



1. AMBLYPTODIA AMANTIES

2. ORNITHOPHERA POMPEUS

3. MORPHO CYPRIS

4. ORNITHOPHERA PRIAMUS

5. PAPILIO HECTOR.

BUTTERBALL — BUTTERFLY-FISH

giving the product a uniform appearance. Hand and power machines are made, the large power workers being also used for blending butters to make them uniform. The makes are variable and numerous; some being combined with a churn, the butter not being removed until it is finished. The former method of working by the hands injured the texture of the product and was too slow. With the present machinery the butter is untouched by hand, can be held at a temperature of 45° to 55° F. during working, and is handled expeditiously. They are a necessity in all creameries and large dairies. See also BUTTER.

Butterball, a duck. See BUFFELHEAD.

Buttercup, the popular name of two or three species of the *Ranunculus* (q.v.).

But'terfield, Daniel, American soldier; b. Utica, N. Y., 18 Oct. 1831; d. Cold Spring, N. Y., 17 July 1901. At the outbreak of the Civil War he was colonel of the 12th New York Militia. He served in the Peninsular campaign, and under Pope and McClellan in 1862. At Fredericksburg he commanded the 5th Corps, and at Chancellorsville and Gettysburg was chief of staff. He served as chief of staff to Hooker at Lookout Mountain, and Ringgold, and Pea Vine Creek, and commanded a division at Buzzard's Roost, Resaca, Dallas, New Hope Church, Kenesaw, Lost Mountain, and other battles. He was brevetted major-general in the regular army. He resigned in 1869, and became chief of the United States sub-treasury in New York. He was author of 'Camp and Outpost Duty' (1862). He is buried in the West Point military cemetery, an elaborate and costly marble tomb marking the spot.

Butterfield, William, English architect; b. 7 Sept. 1814; d. London, 25 Feb. 1900. He first attained distinction by the introduction of color into ecclesiastical buildings with the aid of bricks and mosaic. Among the notable structures designed by him are St. Augustine's College at Canterbury; Keble College, Oxford; All Saints' Church, Margaret Street, London; and the cathedral at Melbourne.

Butterfly, one of the day-flying or diurnal *Lepidoptera* (often called *Rhopalocera*). This group is at once distinguished from the moths by their knobbed antennæ, which are never hairy or pectinated. The body is small, but there is a greater equality in the size of the three regions than in the moths, the abdomen being much shorter and smaller, as a general rule, than in the lower families of *Lepidoptera*. The ocelli are usually wanting; the spiral tongue or maxillæ are long and well developed; and the large, broad wings are carried erect when in repose, and are not held together during flight by a bristle and socket as in most of the moths.

The larvæ or caterpillars vary greatly in shape and in their style of ornamentation, but they uniformly have, besides the thoracic legs, five pairs of abdominal legs. The pupa is called a "chrysalis" or "aurelian," from the bright golden hues which adorn those of many species. They disappear as the wet tissues beneath the pupa-skin harden, just before the fly appears. The pupa is usually angulated on the sides of the thorax and along the upper side of the abdomen. A few species, such as those of *Vanessa*,

hibernate, while several species, such as *V. antiopa*, are social as young larvæ. Butterflies also occasionally swarm while in the perfect state, such as species of *Colias*, *Cynthia*, and *Danaïs*, multitudes of which are sometimes seen passing overhead in long columns. They are truly tropical insects, since Wallace mentions that three times as many species (600) occur at a single point (Para, Brazil) as in all Germany, where scarcely 200 species live. There are about 13,000 species known; about 1,000 inhabit North America, and probably the number will be increased to 1,200, while about 130 species have been found in New England and its immediate border.

The butterflies are divided into six families, beginning with the more primitive and ending with the most specialized, they are: (1) *Hesperidae*; (2) *Papilionidae*; (3) *Pieridae*; (4) *Lycanidae*; (5) *Erycinidae*; and (6) *Rymphalidae*. In the last three families, which comprise the majority of butterflies, the first pair of legs are more or less modified, differing from the two hinder pairs, especially in the male *Nymphalidae*, in the more or less aborted tarsi, or toe-joints. Butterflies are especially liable to local variation, and to seasonal and dimorphic changes; all these varieties, subspecies, and temperature-forms are becoming better known from year to year. Sharp anticipates that eventually the number of species of butterflies may amount to from 30,000 to 40,000 forms. South America is the metropolis of butterflies, as it is of other groups of *Lepidoptera*, being the richest in species of any other continent.

Certain *Nymphalidae* (*Danaïs*, etc.) have glands at the end of the body secreting a repulsive fluid (see MIMICRY); in others there are remarkable differences between the sexes (*Ithomiides*); in certain butterflies some of the scales are battle-drum shaped, and secrete a special odor (*Androconia*). The species of *Ageronia*, a South American genus, make a clicking noise when flying. While caterpillars are plant-eaters, those of several *Lycanidae* are known to be carnivorous, feeding on plant-lice and scale insects.

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Butterfly-fish, or Coral-fish. These beautiful fish, representing the large family *Chaetodontidae* and its allies of the scaly-finned group (*Squamipinnæ*) of marine fishes, obtain their English names from their oval form, brilliancy, and their quickness of movement, and the fact that their principal habitat is in and around the tropical coral-reefs. They are so compressed as to resemble the "pumpkin-seed" sunfishes of the ponds, and are aided in keeping their bal-

BUTTERFLY ORCHID — BUTTERWORT

ance by a very high, arched dorsal fin, and an anal fin extended beyond the tail. Their colors are always gay, usually rich orange-yellow, as a ground tint, set off by broad, black bars and fin ornaments in great variety, besides blue and red touches. The type-genus *Chatodon* is represented by several species in the West Indies, and southward, some of which occasionally drift northward in the path of the Gulf Stream. More numerous in American waters is the "black-angel" (*Pomacanthus arcuatus*), common around Porto Rico and at Key West, where it is caught in traps, or sometimes speared. The "blue-angel" (*Holacanthus ciliaris*) represents a genus containing several West Indian species, of which the most important is the "rock beauty" (*H. tricolor*), often exceeding a foot long, and good food, as well as most beautiful. The name "angel-fish" is also given in Bermuda to several similar fishes of the genus *Anglichthys*, called in Spanish "isabellitas." All these fishes are carnivorous, and Jordan remarks that their excessive quickness of sense and motion enable them to maintain themselves in the struggle for existence in the close competition of the coral reefs, notwithstanding that they are made so conspicuous to their enemies by their bright colors. Consult: Jordan and Evermann, 'Food and Game Fishes of America' (1902).

Butterfly Orchid, a common book name for two varieties of orchids, namely: (1) *Habenaria chlorantha*; (2) *H. bifolia*.

Butterfly Plant, an orchid (*Oncidium papilio*) brought from Trinidad. It is so called because its large yellow and red blossoms, poised on slender footstalks and vibrating with every breath of wind that blows, resemble butterflies hovering on the wing. It is also applied to the Indian butterfly plant, *Phalenopsis amabilis*, of Lindley, not of Blume, which is another orchid. It is a very beautiful epiphyte.

Butterfly Shell, one of the separated plates of a large species of chiton (*Cryptochiton stelleri*), about six inches long. These separate white valves are cast ashore on the beaches of California, where they are gathered as curiosities.

Butterfly-weed, PLEURISY-ROOT, a handsome American perennial herb (*Asclepias tuberosa*) of the natural order *Asclepiadacea*, common in dry ground almost throughout the United States and southern Canada. The large, irregular, yellowish-brown tubercular roots have a nauseous, bitter taste, and are reputed useful in lung and throat troubles, rheumatism, etc., but seem to be less popularly used than formerly. The hairy stems, which rise to a height of two or three feet, bear alternate oblong lanceolate leaves, and several umbels of short-peduncled, bright orange-yellow flowers followed by erect pubescent pods. Unlike other members of the genus, this plant has not a milky sap.

Butterick, Ebenezer, American pattern maker: b. Sterling, Mass. 1825; d. Brooklyn, N. Y., 31 March 1903. In early life he was a tailor's apprentice, and in 1859 set up in business for himself in Fitchburg, Mass., and shortly after began experiments in pattern-making, the result of which was the invention of the tissue paper dress-pattern. He removed to New York in 1864, and founded subsequently the Butterick Company, retiring from business in 1881.

But'terine, a substance prepared in imitation of butter, from animal or vegetable fats. The fat is first freed from all impurities, and by heat converted into oleine. The oleine is then transferred to a churn containing a small quantity of milk and churned into butterine. Lastly, it is colored in imitation of butter. Freshly prepared, it is sweet and palatable, and when spread on bread or cold toast is but slightly inferior to a fair quality of butter. The process has attained such perfection in the matter of manufacture in the United States that it takes an expert to distinguish it from genuine butter, and laws have been passed compelling tradesmen to label each package containing it so that no one may be deceived. See OLEOMARGARINE.

But'termere, a small but beautiful sheet of water in the famous Lake district of England, six miles southeast of Derwentwater.

Buttermilk, the fluid left behind after churning milk for butter. It possesses a specific gravity, somewhat higher than ordinary milk, owing to the removal of most of the fat, and varying between 1.032 and 1.035 per cent at 59° F. It may be fresh or sour, according to the method of churning. It should not contain more than 0.5 to 0.6 per cent of butter-fat. Its composition is variable, an average of 85 analyses being: Water, 90.1 per cent; fat, 1.1; protein, 4.0; milk sugar and lactic acid, 4.0; ash, 0.7 per cent. Its dry matter is practically all digestible, and it is a healthy and nutritious beverage, much relished by many people. Its fuel value per pound is 165 calories. It has about the same value as skimmilk for pig-feeding, and is used in conjunction with corn meal or some other grain, excellent pork being produced. It is also used for calf-feeding, although failures are reported in the undertaking. In fattening poultry it is highly esteemed. See also BUTTER.

Butternut (WHITE WALNUT), a large spreading tree (*Juglans cinerea*) of the natural order *Juglandacea*, native of America, where it ranges from New Brunswick to Georgia and westward to Dakota and Arkansas. It sometimes attains a height of 100 feet, but usually varies from 50 to 80. It has smooth, gray bark, large compound pubescent leaves, small flowers, followed by oblong, pointed, ribbed green nuts covered with viscid hairs. The ripe nuts when dried have very hard shells and are highly prized for dessert in regions where the trees grow; and the green nuts are used for making pickles. The bark of the stems has been used in dyeing and that of the root in medicine. The wood is used to some extent for cabinet work and interior finish of houses, but is less popular than black walnut. An inferior sugar can be made from the sap. The tree is not quite so attractive as the walnut and is less densely covered with foliage, but is less attacked by insects.

But'terwort, a genus of about 30 species of small succulent plants (*Pinguicula*) of the natural order *Lentibulariaceae*, widely distributed throughout the world in bogs and other wet ground. The species have rosettes or tufts of leaves, from among which single-flowered scapes arise to about a foot. The short, thick, sticky-haired leaves attract small insects which are covered by the in-rolling leaf-margins and digested. The leaves of certain species, especially

BUTTERFLIES AND MOTHS



SWALLOW-TAIL BUTTERFLY
GAMMA MOTH

DARK-GREEN FRITILLARY

BRIMSTONE BUTTERFLY
SILVER-WASHED FRITILLARY

BUTTERFLIES AND MOTHS



1. MULBERRY SILKWORM, CATERPILLAR
AND ADULT

2. SOUTH AMERICAN SILK MOTH
3. CHINESE SILK MOTH

4. ALANTHUS MOTH

BUTTERWORTH — BUTTON

of the common butterwort (*P. vulgaris*) are used like rennet to coagulate milk, and thus form a favorite food in Lapland and the Alps. The milk (reindeer milk in Lapland) is poured upon the leaves, strained, allowed to stand 48 hours, or until creamy and somewhat acid, when it is ready for use as food or for impregnating other milk for the same purpose. This property is said by some authorities to account for the English name, but others attribute the name to the buttery feeling of the leaves. Several species are cultivated for their dainty flowers, and as curiosities on account of their carnivorous habits, but they are rather difficult to manage unless conditions are naturally right. They are less popular in America as greenhouse plants than in Europe. Several species are natives of the United States.

But'terworth, Hezekiah, American story writer and poet: b. Warren, R. I., 22 Dec. 1839. He was editor of the *Youth's Companion*, 1871-4. He has published many popular juvenile stories and travels, including 'Ziz-Zag Journeys' (1876-1890); 'Songs of History: Poems and Ballads upon Important Episodes in American History' (1887); 'The Wampanoet Belt, or the Fairest Page of History' (1896); 'A Knight of Liberty'; 'The Patriot Schoolmaster'; 'Poems for Christmas, Easter, and New Year'; 'The Boyhood of Lincoln'; 'Boys of Greenway Court'; 'In Old New England'; 'Traveler Tales of China'; 'Over the Andes'; 'Great Composers'; 'South America'; and many others.

Buttmann, büt'man, Philip Karl, German philologist: b. Frankfort-on-the-Main, 5 Dec. 1764; d. Berlin, 21 June 1829. He spent most of his life at Berlin, where he taught in the Joachimsthal University. His best-known works are his 'Greek Grammar' (1792); 'Lexilogus for Homer and Hesiod' (1818).

But'ton, Sir Thomas, English navigator in the early part of the 17th century, the successor of Hudson in exploring the northeastern coast of North America. He sailed in 1612 with two vessels, the *Resolution*, and the *Discovery*, passed through Hudson Strait, and was the first to reach land on the western coast of the bay. The point which he touched was in lat. 62°, and was named by him Carey's Swan's Nest. Being obliged to winter in this region, he selected a position near the mouth of a river, first named by him Nelson's, after the master of his ship. Every precaution was taken against cold and icebergs, yet the severity of the climate occasioned much suffering to his crew, and was fatal to a few of them. During the next summer he explored and named several places on the coast of Hudson Bay, and advancing to lat. 65°, became convinced of the possibility of the Northwest Passage.

Button, a small circular disk or knob of mother of pearl, horn, metal, or other material, with a shank or perforations through its centre for attachment to an object, and made to fit into a hole formed in another one for its reception, the two fastening the objects together. Its chief use is to unite portions of a dress together. The ancient method of fastening dresses was by means of pins, brooches, buckles and tie-strings. Buttons of brass are found on dresses of the 16th century. Gilt buttons were

first made in 1768, and those of papier-mâché in 1778. Buttons of vegetable ivory are now all but universally used for tweed coats and vests. The palm fruit which yields it is called corozo nut. It is not unlike true ivory but softer, and is easily turned and dyed. These buttons are often mottled with some stain to suit the common patterns of tweed stuffs. Mother of pearl buttons are formed of the beautiful substance of which the large flat shell of the pearl oyster consists, and this has long been a favorite material for buttons. Small cylinders are first cut out of the shells with a tubular saw. These are then split into disks, which are shaped by a steel tool, drilled with holes, and finally polished with rotten stone and soft soap, or by a more recent method with ground charcoal and turpentine. Shirt studs as well as flat and globular buttons with metal shanks are also made of this substance.

Among other animal substances used for buttons are ivory, bone, horn, and hoof. From this last so-called horn buttons were some years ago made in enormous numbers by pressing them in heated dies in which the design was cut. There are many kinds of composition buttons. Glass buttons are made in great variety. For pinched buttons small rods of colored glass are heated at the ends, and pressed into shape by means of a pair of rather long hand pliers, on the ends of which are a die and its counterpart, likewise kept hot. Other kinds are cut out of colored sheet glass, which is coated on the back with tin amalgam like a mirror. With other varieties, some beautiful glass buttons are made in Bohemia, either partly or wholly of aventurine glass; and of this gold-spangled material artistically inwrought with other colors, studs and solitaires still more remarkable for their beauty and minute patterns are made at Venice. Porcelain buttons were a few years ago nearly all of French manufacture, but are now made principally at Prague. The plastic clay is pressed into molds of plaster of Paris in the same way as small objects are usually produced in earthenware. Some are plain and others are painted or printed with patterns. More or less expensive buttons are made of ornamental stone, such as agate, jasper, and marble. Occasionally they are formed of amber, jade, or of still more costly materials, as pearls and gems. In recent years, improved methods and machines have been introduced for the shaping as well as for the polishing and finishing of bone, corozo, and wood buttons. In England, Birmingham is the seat of the button trade, which, however, is much more largely developed in France. Brass buttons were made in Philadelphia in 1750, and hard-wood buttons were made there soon after. The button factory in Waterbury, Conn., now the seat of the metal button manufacture, was established about 1800. Horn buttons were made in the United States as early as 1812, and the production of buttons covered by machinery was begun at Easthampton, Mass., by Samuel Williston in 1827. The making of composition buttons was begun at Newark, N. J., in 1862. Up to 1900 there had been 1,355 patents for buttons issued by the patent office of the United States. In 1850 there were in the United States 59 establishments for the manufacture of buttons, with an output whose value was placed at \$964,359. In 1900, according to the returns of the Twelfth Census, there were 238 establish-

BUTTON-QUAIL — BUXTON

ments, with a capital of \$4,212,568, and an output valued, including custom-work and repairing, at \$7,695,910. The value of imported buttons was stated in 1900 at only \$600,982, as against \$2,176,046 in 1891. For a valuable detailed account of the button industry in the United States, consult Bulletin 172 of the Twelfth Census.

Button-quail, a small quail-like bird of the genus *Turnix*, of which there are some 20 species in various parts of the Old World, some of which are termed bustard-quail, bush-quail, ortygan, and hemipode. They frequent wooded places, and afford good sport for the gunner. The females, as well as the males, are brightly colored, and on account of their natural pugnacity are trained by the natives of India to fight as a sport.

Buttonwood, a name often given to the North American plane (*Platanus occidentalis*). See PLANE.

Buttresses, in Gothic architecture, are lateral projections on the outside of the walls of an edifice, extending from the top to the bottom at the corners and between the windows, and intended to impart stability to a wall. Except in valuted construction, the buttress is seldom employed, as its purpose is to balance an outward thrust or pressure by an inward one. There are four chief forms of buttresses—internal, external, pier buttresses, and flying buttresses. This feature began in Byzantine architecture, was more fully developed in Romanesque, and in Gothic architecture attained its highest development. As soon as ribbed cross vaults made their appearance the chief function of the buttress was made manifest, and the flying buttress was wholly a detail of Gothic period.

Buttz, Henry Anson, American educator: b. Middle Smithfield, Pa., 18 April 1835. He was graduated at Princeton in 1858, and entered the Methodist ministry the same year. He has been president of Drew Theological Seminary since 1880, and has written much on polemics, exegetics, and hermeneutics.

Bu'tyl, an organic monad, fatty radical, having the formula (C_4H_9); also called quartyl, or tetryl, from its containing four carbon atoms.

Butyrellite, the scientific name for Bog-butter (q.v.).

Butyric Acid, an acid obtained from butter; it also occurs in perspiration, in cod liver oil, and other fats, and in meat juice. When obtained, as it may be from butter and from sugar, it is in the form of a clear, oily, volatile fluid. It combines with bases, and forms crystalline salts, which possess no taste. Butyric acid is a colorless liquid, having a smell like that of rancid butter; its taste is acrid and biting, with a sweetish after-flavor. Formula, $C_3H_7 \cdot Co \cdot OH$.

Butyric Ether, a substance obtained from butyric acid, with the flavor of pineapples, used in flavoring confectionery, as an ingredient in perfumes, etc.

Butz, boots, Kaspar, German-American versifier: b. Hagen, Westphalia, 23 Oct. 1825; d. Des Moines, Iowa, 17 Oct. 1885. He was a

prominent political journalist in his native land in the stirring days of 1848, but was forced to flee to the United States. He became prominent in Chicago journalism, and produced pleasing verse, collected in 'A German-American's Poems' (1879), and 'Grandfather Songs' (1887).

Buxar, buks'ar, or **Baxar**, a town of British India, in the district of Shahabad, presidency of Bengal, situated on the south bank of the Ganges, about 60 miles below Benares. It is a large town, with houses built after the usual Indian fashion of mud and thatch, a few bungalows of somewhat better character occupied by Europeans, a good bazaar, and some handsome mosques. On an eminence near the river is a small fort, now dismantled. Buxar is celebrated for a victory, which confirmed the British in the possession of Bengal and Bahar, obtained 23 Oct. 1764 by Sir Hector Munro. Pop. (1891) 15,506.

Buxbaumia (named for John Christian Buxbaum, a German who published a botanical work on Asia Minor in 1728), a genus of mosses containing a solitary species (*B. aphylla*), so like a fungus that it might be easily mistaken for one. Buxbaumia is by some made the type of an order *buxbaumiacæ*.

Buxtehude, Dietrich, dē'trīk buks-tē-hoo'-dē, German organist and composer: b. Elsinore, 1637; d. 1707. In 1668 he became organist of the Marienkirche at Lubeck, a position of much importance, and was long influential in musical matters throughout Germany. He established the 'Abendmusiken,' famous even so late as the 19th century. These were organ services given on the afternoons of the Sundays in Advent, and it is said that Bach once walked 50 miles to attend one of them.

Bux'ton, Jedediah. See CALCULATORS, REMARKABLE.

Buxton, Sydney Charles, English publicist: b. Oehlen, 1853. He was educated at Clifton College, and Trinity College, Cambridge, and has sat in Parliament as member for Poplar since 1886. He was under-secretary for the colonies 1892-5, and has published 'Handbook to Political Questions,' which has reached a ninth edition; 'Political Manual'; 'Finance and Politics: An Historical Study, 1873-85'; 'Handbook to Death Duties'; 'Mr. Gladstone as Chancellor of the Exchequer: a Study' (1901); 'Fishing and Shooting' (1901).

Buxton, Sir Thomas Powell, English philanthropist: b. Earl's Colne, Essex, 1 April 1786; d. 19 Feb. 1845. He was educated at Trinity College, Dublin, and in 1811 joined the firm of the celebrated brewers, Truman, Hanbury & Company, and took an active share in carrying on the business. In 1816, on the occasion of the Spitalfields distress, he made his first public effort in a speech at the Mansion House, and afterward succeeded in organizing an extensive system of relief. He next proceeded, in concert with his sister-in-law, the celebrated Mrs. Elizabeth Fry (q.v.) to examine into the state of prisons; and as the result of his inquiries produced a work entitled 'An Inquiry Whether Crime and Misery are Produced or Prevented by Our Present System of Prison Discipline,' which attracted great attention, and led to the formation of the Prison

BUXTON — BUZZARD'S BAY

Discipline Society. In 1818 he was elected member of Parliament for Weymouth, and continued to sit for it in successive Parliaments till 1837. He distinguished himself by his enlightened zeal in the cause of humanity, and was long the right-hand man of Wilberforce, who, on retiring from public life selected Buxton as the person best qualified to carry out those of his benevolent schemes which remained uncompleted. In 1823 he moved, and with a slight modification, carried a resolution to the effect that slavery, being repugnant to the Christian religion and the British Constitution, ought to be abolished. Subsequently in 1831 he made such an impression on the house and country by an admirable speech that the government were glad to take the matter into their own hands and give full effect to emancipation. After his retirement from Parliament the slave trade occupied much of his thoughts, and he published a work entitled 'The Slave-trade and Its Remedy.' In 1840 he was created a baronet. See 'Memoirs of Sir T. F. Buxton, Bart' (1872).

Buxton, a town in Derbyshire, England, 37 miles northwest of Derby, and 25 south-southeast of Manchester. Buxton has long been famous for its calcareous springs, the waters being taken for indigestion, gout, rheumatism, and nervous and cutaneous diseases. The locality was known to the Romans, who had baths here. The season extends from May to October, some 15,000 persons visiting the springs annually. The town is 900 feet above sea-level and is situated in a deep valley. Much of the splendor of Buxton is due to the Dukes of Devonshire, one of whom, in 1780, at the cost of \$600,000, erected an immense three-storied pile of buildings, called the Crescent. Near Buxton is the Diamond Hill, famous for its crystals; and Poole's Hole, a gas-lit stalactite cavern 770 yards long. Mary, Queen of Scots, was at Buxton when in the custody of the Earl of Shrewsbury. Pop. (1901) 10,181.

Buxtorf, Johann, yō'han būks'tōrf (THE ELDER), German Orientalist: b. Kamen, Westphalia, 25 Dec. 1564; d. Basel, 13 Sept. 1629. Being very learned in Hebrew and Chaldaic, in the acquirement of which he obtained the assistance of many learned Jews, he was engaged by the magistrates of Basel to become professor of those languages, which he taught with great success. His chief works are: 'Lexicon Chaldaicum Talmudicum et Rabbinicum'; 'Thesaurus Linguae Hebraicae'; 'Biblica Hebraica Rabbinica'; 'Synagoga Judaica hoc est Schola Judaeorum'; 'Institutio Epistolaris Hebraica'; 'Concordantiae Bibliorum Hebraicorum.'

Buxtorf, Johann (THE YOUNGER), German Hebraist: b. Basel, 13 Aug. 1599; d. there, 16 Aug. 1664; son of the preceding. He succeeded his father in the chair of Hebrew at Basel, and occupied it for 34 years, until his death. The same chair was filled by his son and his nephew successively during 68 years longer, making a combined occupancy of this professional chair by the Buxtorf family for an unbroken period of 140 years. He completed and published two of his father's principal works, the most important publication of his own being the 'Lexicon Chaldaicum et Syriacum.'

Buxus, the genus name of a number of shrubs or small trees. See Box.

Buys-Ballot, bois-ba-lō, **Christophorus Henricus Didericus**, Dutch meteorologist: b. Kloetinge, Zeeland, 10 Oct. 1817; d. Utrecht, 2 Feb. 1890. He studied at the University of Utrecht, where he became professor of mathematics in 1847, and professor of experimental physics in 1870. In 1854 he received the appointment of director of the Royal Meteorological Institute at Utrecht. He was one of the initiators of the new system, under which, by daily synoptical weather reports, and simultaneous observations by land and sea, materials are collected for forecasting changes. His own observations have resulted in the determination of a general law of storms, known as the Buys-Ballot law. The inventor of a system of weather signals, he was largely instrumental in bringing about an international uniformity in meteorological observations. His works include 'Changements Périodiques de la Température' (1847); and, in English, 'Suggestions on a Uniform System of Meteorological Observations' (1872-3).

Buyukdereh, bī-yook'dē-rā, a little town on the western side of the Bosphorus, situated in the midst of a large, deep-bosomed valley. It is the summer residence of the Christian embassies at Constantinople, and its gardens and palaces, not less than its natural beauty and coolness, make it a favorite promenade ground. A group of plane-trees, the most splendid on the Bosphorus, the Russian palace, distinguished by the regularity of its architecture, and the extensive gardens of Baron Hubsch, are particularly mentioned. The tradition that Godfrey of Bouillon encamped here with his army is not alluded to in the original records of the crusades.

Buzfuz, Sargeant, a character introduced by Dickens in the 'Pickwick Papers.' He is the barrister who becomes counsel for the plaintiff in Mrs. Bardell's breach of promise suit against Mr. Pickwick, and is remarkable for the ingenuity he displays in drawing incriminating inferences from ordinary and inconsequential occurrences.

Buzzard, a term given in America to two distinct groups of birds—buzzard-hawks of the genus *Buteo* and its allies, also familiar to Europeans, and the turkey-buzzard—a vulture. The buzzard-hawks are closely related to the eagles, from which they are distinguished by the smaller size in the majority of cases, the smaller and rounder head, and a slow and heavy manner of flight. They feed chiefly upon the smaller mammals and reptiles, seldom catching or disturbing poultry, although popularly accused of it and styled "hen-hawks." Important North American species of the genus *Buteo* are the red-tailed, red-shouldered, Swainson's, and broad-winged hawks, all of which are elsewhere described under their names. The most important of the genus *Archibuteo* is the rough-legged hawk (q.v.), and the handsomest one, the squirrel hawk (q.v.) of California. In the southern United States the name usually refers to the common black vulture (*Cathartes aura*). See TURKEY BUZZARD.

Buzzard's Bay, on the southeast coast of Massachusetts, is about 30 miles long, and has a mean breadth of 7 miles. It is sheltered from the ocean and separated from Vineyard

BUZZING — BYLES

Sound by the Elizabeth Islands. Its chief harbors are those of New Bedford, Fairhaven, Wareham, and Mattapoisett.

Buzzing, the sounds produced by many insects, other than by mechanical means, that is, by friction. How the buzzing of bees, flies, etc., is produced has been a disputed question. Two distinct sounds may be distinguished—one, a deep noise, is due to the vibration of the wings, and is produced whenever a certain rapidity is attained; the other is an acute sound, and is said to be produced by the vibrations of the walls of the thorax, to which muscles are attached; this sound is specially evident in *Diptera* and *Hymenoptera*, because the integument is of the right consistence for vibration. In both of these, observers agree that the spiracles are not concerned in the matter. Laudois tells us that the wing-tone of the honey bee is A'; its voice, however, is an octave higher, and often goes to B" and C". The sounds produced by the wings are constant in each species, except where, as in *Bombus*, there are individuals of different sizes; in these the larger ones generally give a higher note. Thus, the comparatively small male of *B. terrestris* hums on A', while the large female hums an entire octave higher. Consult Sharp, 'Insects' (New York 1899); Packard, 'Textbook of Entomology' (New York 1898).

By-Law, a particular or private law, as the local or subordinate law of a city, town, private corporation or other organization. The power to make by-laws is usually conferred by express terms of the charter creating the corporation; though, when not expressly granted, it is given by implication, and it is incidental to the very existence of a corporation. The Constitution of the United States and acts of Congress made in conformity to it, the Constitution of the State in which a corporation is located, and all acts of the legislature constitutionally made, together with the common law as there accepted, are of superior force to any by-law; and any by-law, when contrary to either of them, is void, whether the charter authorizes the making of such by-law or not; because no legislature can grant power larger than it possesses.

Byblos, bīb'lōs, an ancient maritime city of Phœnicia, now called Jebail, a little north of Beyrout. It was the chief seat of the worship of Adonis or Thammuz.

Byerly, William Elwood, American mathematician: b. Philadelphia, 13 Dec. 1849. He graduated at Harvard College in 1871; was assistant professor of mathematics at Cornell University from 1873-6 and at Harvard from 1876-81, when he became professor. Among his works are: 'Elements of Differential Calculus'; 'Elements of Integral Calculus'; 'Problems in Differential Calculus'; and a 'Treatise on Fourier's Series and Spherical, Cylindrical and Ellipsoidal Harmonics.'

By'ers, Samuel Hawkins Marshall, American historical writer: b. 23 July 1838. During the Civil War he served in the Union army, was taken prisoner, and while in prison at Columbia, S. C., wrote the famous song 'Sherman's March to the Sea.' He was consul at Zürich, Switzerland, from 1869 to 1884, and consul-general to Italy in 1885. Among his

works are: 'Iowa in War Times'; 'Switzerland and the Swiss'; 'Twenty Years in Europe'; and many poems.

Byford, William Heath, American physician: b. Eaton, Ohio, 20 March 1817; d. 1890. He graduated at the Ohio Medical College and a few years later became professor in the Evansville Medical College. He established a practice in Chicago; in 1857 became professor of obstetrics and diseases of women and children, in the Rush Medical College of that city, and in 1880, professor of gynecology in the same institution. For many years he was president and professor of clinical surgery in the Women's Hospital Medical College, and was twice president of the American Medical Association. Among his works are: 'Practice of Medicine and Surgery Applied to Diseases and Accidents Peculiar to Women'; 'Philosophy of Domestic Life'; and 'Theory and Practice of Obstetrics.'

By'ington, Ezra Hoyt, American author: b. Hinesburgh, Vt., 3 Sept. 1828; d. Newton, Mass., 16 May 1901. He was educated at the University of Vermont and Andover Theological Seminary; entered the Congregational ministry and filled several pastorates. Among his works are: 'The Puritan in England and New England'; 'The Puritan as Colonist and Reformer'; 'The Christ of Yesterday, To-day, and Forever'; and histories of a number of local churches.

Byles, Mather, American clergyman: b. Boston, 26 March 1706; d. there, 5 July 1788. He was ordained over the church in Hollis Street, in Boston, in the year 1733, and obtained a distinguished position among the contemporary clergy. He was learned after the manner of those times, and was more addicted to literary recreations, and had a keener relish of the later humanities, than was then common among the members of his profession. As a proof of his recognized excellence in polite letters, we may accept the fact that he was the correspondent of some of the chief poets and authors of England. He was himself a votary of the muses in a small way, and a volume of his miscellaneous poems was published in 1744. He gave an early expression, too, to the loyalty which distinguished his character through life, in a poem on the death of George I. and the succession of his son, in 1727, when he was but 21 years of age. He also tempered the bereavement which Gov. Belcher had suffered in the loss of his wife in 1734, by such consolation as an elegiac epistle could convey. It is not likely, however, that his name would have been preserved to this time had his reputation depended on the merits of his poetical effusions. The cheerful flow of his spirits and frank gaiety of his conversation seem to have been something out of the common way, and to have left an enduring mark on the memories of that generation. His piety was tinged with no asceticism, and the lively sallies of his sprightly imagination, always kept within the limits of decorum, were restrained by no fear of injuring his personal or clerical dignity. He was an ardent Royalist and in 1777 was sentenced to banishment, but was allowed to remain under guard in his own house. This severity was soon relaxed for a while, and afterward renewed. One of the stories told of him is, that wishing to have an errand done at a distance, he asked the

sentry to undertake it. The man objected on the ground that he could not leave the door unguarded; on which the doctor volunteered to be his substitute, and, accordingly was seen by some one in authority, in powdered wig and cocked hat, with a musket on his shoulder, walking up and down before his house, keeping guard over himself. His release from custody soon followed, on which occasion, alluding to these changes of treatment, he said that he had been "guarded, regarded, and disregarded."

Byllynge, Edward, English provincial governor: d. 1687. He became joint purchaser with John Fenwick of a large tract of land in what is now the State of New Jersey. Upon the occasion of a dispute between the two proprietors, nine tenths remained, by Penn's decision, with Byllynge and was long known as "the Byllynge Tenthis." He was governor of the province of West Jersey in 1677.

Byng, bing, George Viscount Torrington, English admiral: b. Wrotham, Kent, 27 Jan. 1663; d. 17 Jan. 1733. He entered the navy at the age of 15. In 1688 he recommended himself to William of Orange, and for his gallant conduct at the sea-fight of Malaga was knighted by Queen Anne. In 1718 he commanded the English fleet sent to Sicily for the protection of the neutrality of Italy, and on 31 July utterly destroyed the Spanish fleet off Messina. He was created Viscount Torrington in 1721.

Byng, John, English admiral: b. 1704; d. 14 March 1757. He was the son of Viscount Torrington, and by his own merits, as well as the influence of his name, was raised to the rank of admiral. His attempts to relieve Fort St. Philip, in Minorca, when blockaded by a French fleet under La Galissonière, proved abortive, and his hesitation in engaging the enemy, when a bold attack might have perhaps gained him the victory, excited the clamor of the nation against him. The ministry, who wished to avert the public odium from their unsuccessful measures, beheld with seeming satisfaction the unpopularity of Byng, and when he was condemned by a court-martial they suffered him, though recommended to mercy, to be sacrificed to the general indignation, and he was shot at Portsmouth.

Bynkershoek, bîn'kêrs-hook, Cornelius van, Dutch jurist: b. Middleburg, Zeeland, 29 May 1673; d. 16 April 1743. He studied at the University of Franeker, and after practising as a barrister at The Hague, became professor of law at Leyden, and president of the supreme council of Holland. He was one of the most learned among modern civilians. His books are in Latin, and his treatise 'De Foro Legatorum Competente' was translated by Barbeyrac into French under the title of 'Du Juge Compétent des Ambassadeurs' (1728). His most important writings are the 'Observationes Juris Romani'; 'De Dominio Maris'; 'Quæstiones Juris Publici'; and a digest entitled 'Corpus Juris Hollandici et Zelandici.' A complete edition of his works was published at Geneva in 1761, and at Leyden in 1766.

Byn'ner, Edwin Lassetter, American novelist: b. Brooklyn, N. Y., 1842; d. Boston, 1893. He was librarian of the Boston Law Library, and author of short stories and of several novels, including 'Tritons' (1878);

'Agnes Surriage' (1886); 'Penelope's Suitors' (1887).

Byr, bûr, Robert, pseudonym of KARL ROBERT EMMERICH BAYER (q.v.).

Byrd, bérđ, William, American lawyer and author: b. Westover, Va. 1674; d. there, 26 Aug. 1744. He received a liberal education in England, possessed one of the largest libraries in the colonies, and, having a large property, lived in a splendid style, unrivaled in Virginia. He was a member and at last president of the King's Council. To French Protestants fleeing to Virginia from persecution in France, he extended the most generous assistance. The towns of Richmond and Petersburg were laid out by him, and he was one of the commissioners for establishing the boundary line between Virginia and North Carolina. He was a member of the Royal Society, and as a patron of literature and art deserves remembrance. His own writings include the 'Westover Manuscripts,' embracing 'The History of the Dividing Line'; 'A Journey to the Land of Eden'; and 'A Progress to the Mines.' In 'The Virginia Magazine of History and Biography' (1902) appeared his letters, revealing much of interest concerning his personality and career.

Byrd, William, composer. See BIRD, WILLIAM.

Byrgius, bér'jî-ÿs, Justus (properly JOBERT BÜRGI), Swiss mathematician: b. Lichtensteig, Canton of St. Gall, Switzerland, 28 Feb. 1552; d. Cassel, Germany, 31 Jan. 1632. He was invited to Cassel by the landgrave of Hesse to superintend the observatory which he had there erected, and constructed a number of astronomical instruments, some curious clocks, and other machines. A discovery involving that of the logarithms, and another exhibiting an application of the pendulum to clocks, have been attributed to him. He is eulogized by Kepler for his talents, but censured for his indolence and undue reserve, which kept back his discoveries from the public.

Byrne, Thomas Sebastian, American clergyman: b. Hamilton, Ohio, 29 July 1842. In youth he was an expert machinist, but deciding to enter the priesthood of the Roman Catholic Church he went, after preparatory training, to the American College in Rome. In 1860 he was ordained in Cincinnati. He devoted himself to literature and teaching in Mt. St. Mary's Seminary; for a time had charge of the Cincinnati Cathedral and again became connected with the seminary, acting as rector until 1894. He wrote 'Man from a Catholic Point of View.'

By'rom, John, English poet and stenographer: b. near Manchester, 29 Feb. 1692; d. 26 Sept. 1763. He was educated at Merchant Taylor's School and Trinity College, Cambridge, and for some time studied medicine, but his chief means of livelihood for many years, till he inherited the family estates in 1740, was teaching shorthand on a system invented by himself. He was on friendly terms with many of the eminent men of his time. His earliest writings were a few papers to the 'Spectator'; his poems (collected in 1773) were chiefly humorous and satirical, and show remarkable facility in rhyming.

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Byron, George Gordon Noel (LORD BYRON), English poet: b. London, 22 Jan. 1788; d. 19 April 1824. He was a grandson of Admiral John Byron (q.v.) and son of the admiral's only son, Capt. John Byron, of the Guards, notorious for his gallantries and dissipation. The eccentricity and misconduct of the old Lord Byron and of the captain, his nephew, the reputation of the family, ancient and honorable in English history, was much tarnished. The former was tried by his peers for killing his relation, Mr. Chaworth, in a duel after a tavern dispute, and although he escaped conviction he was consigned by public opinion to a life of obscurity. Capt. Byron, the poet's father, was so dissipated that he obtained the name of Mad Jack Byron. He was one of the handsomest men of his day, but so immersed in all the fashionable vices that to be seen in his company was deemed discreditable. In his 27th year he seduced Amelia, Marchioness of Carmarthen, daughter of the Earl of Holderness, to whom, on a divorce following, he was united in marriage. Two years later, on his wife's death, he married Miss Catherine Gordon, heiress of Gight, Aberdeenshire, but he speedily dissipated her fortune and left her a widow in 1791, with a son, the subject of this article, then only three years of age.

Previously to her husband's death, by whom she had been deserted, Mrs. Byron retired with her child to Aberdeen, where she lived in seclusion on the ruins of her fortune. The circumstances of his childhood operated materially in the formation of his character. His mother was a woman of capricious temper, who at one time treated him with injudicious indulgence, at another with less excusable harshness. Of a sensitive nature, a slight malformation in both of his feet was felt as a galling defect, and his mother is even said to have taunted him with this deformity. To strengthen his constitution he was sent to various places in the country, including the neighborhood of Ballater and Lochnagar, where both scenery and legend combined to foster the poetical tendencies of the boy. From 1794 to 1798 he attended the grammar school of Aberdeen, where he was more distinguished by great occasional exertions, in order to make up for the intervals of absence rendered necessary by his delicacy of health, than by general application. In all boyish sports, however, the ardor of his temperament enabled him to surmount his natural disadvantages.

In 1798 the death of his grand-uncle without issue gave him the titles and estates of the family; on which, being then 10 years of age, he was removed from the immediate care of his mother and placed under the guardianship of the Earl of Carlisle, who had married the sister of the late Lord Byron, a lady of considerable poetical abilities. On this change the youthful Lord was placed at Harrow, where he distinguished himself more by his love of manly sports and undaunted spirit than by attention to his studies or submission to school discipline. While yet at school he fell in love with Miss Chaworth, the daughter and heiress of the gentleman who had fallen by the hand of his grand-uncle, whom he met with on his occasional visits to Newstead. This lady ultimately married another and more mature suitor, and the

disappointment wounded the ardent spirit of the youthful lover.

When between 16 and 17, he entered Trinity College, Cambridge; and here, as at Harrow, his dislike of discipline subjected him to much merited reproof, which he repaid with sarcasm and satire. Among other practical jokes he kept a bear, which, he observed, he was training up for a degree. At 19 he quitted the university and took up his residence at the family seat of Newstead Abbey, where he employed himself chiefly in amusement, especially in aquatic sports. In 1807, while still at Newstead, he arranged his early productions, which he caused to be printed at Newark, under the title of 'Hours of Idleness, by George Noel Gordon, Lord Byron, a Minor.' These poems, although exhibiting some indication of his future power, betrayed several marks of juvenility and imitation, which induced the Edinburgh reviewers to indulge in an attack, much less distinguished for wit or acumen than for unreasonable causticity and ill-nature. The ridicule produced by this critique roused the anger of the poet, who took revenge in his celebrated satire of 'English Bards and Scotch Reviewers' (1809). The spirit of resentment is seldom very just; and the anger, rather than the judgment of Byron, guided his pen on this occasion. Singularly enough, owing to party and other predilections, a number of persons satirized in this poem, no long time after were numbered among the friends of the author; for which reason, after it had passed through four editions, he suppressed it.

About this time Byron fell into a career of dissipation and his fortune became deeply involved before he had attained legal maturity, and his constitution was much impaired by excesses. In 1809 he determined to travel, and in company with his fellow-collegian, John Cam Hobhouse, afterward Lord Broughton (q.v.), he embarked at Falmouth for Lisbon, and proceeded through the southern provinces of Spain to the Mediterranean. His subsequent peregrinations in Greece, Turkey, etc., have been rendered famous by his fine poem, 'Childe Harold's Pilgrimage.' He returned home in June 1811, after an absence of two years, and was soon summoned to Newstead in consequence of the dangerous illness of his mother, who died before he could reach her.

In 1812 Byron gave to the world the first two cantos of 'Childe Harold's Pilgrimage.' This assumption of the character of a wayward libertine, satiated by an over-cultivation of pleasure into misanthropy, tedium, and listlessness, and that in such a manner that the application would necessarily be made to himself, afforded proof both of the perverted feeling and of the originality of Byron. There was, however, a boldness in the repulsive personification, and a force and energy in the mode of supporting it, so indicative of great powers, that it at once produced a strong impression. Eulogy now flowed in from all quarters. Even those who disapproved of the misanthropy and sombre views of human nature displayed in this extraordinary production confessed its genius. The feeling of admiration became general, and, fashion turning directly in his favor, his acquaintance was widely courted. His manners, person, and conversation heightened the charm with which

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his talents had invested him. Although easy and affable in his general manners, the latent reserve of conscious genius was always observable. Even his physiognomy was calculated to keep up the interest which he otherwise inspired; the predominating expression of his fine features being that of deep and habitual thought, although, when engaged in interesting discussion, they as forcibly exhibited gaiety, indignation, and satire. Thus, the enthusiastic looked on him to admire, the serious to admonish, and the soft with a desire to console. The latter sympathy he excited too powerfully in certain quarters, and a course of noxious intrigue was the consequence. It is more gratifying to observe that, in the midst of all this license, he was capable of delicate and generous actions, of which a number of well-authenticated instances are on record.

The quick and scrutinizing glance which he had cast on Eastern character and manners was now manifested in 'The Giaour,' 'The Bride of Abydos,' 'The Corsair,' 'Lara,' and 'The Siege of Corinth,' which followed one another in quick succession, 1813-14. For parliamentary duties he seems to have had a decided distaste, and it was not until his return from the Continent that he ventured to speak. He made his maiden speech in February 1812, from the opposition bench, against the Frame-work bill, and was argumentative and lively, if not very original. Having now become a character whose support might be of considerable consequence, he was congratulated accordingly. Another time he addressed the house in support of Catholic emancipation, and a third and last time on presenting a petition from Major Cartwright.

On 2 Jan. 1815 Byron married Anna Isabella, the only daughter of Sir Ralph Milbanke. Their married life was soon disturbed by pecuniary embarrassments, in consequence of which Lady Byron, who had borne a daughter on 10 December, returned to her parents, and ultimately refusing to return to her husband, a formal separation followed. The real reason of Lady Byron's separation from her husband is still uncertain; for the reason which Mrs. Stowe laid before the public in 1869, alleging it to be the real one as stated by Lady Byron herself, seems inconsistent with the circumstances of the case and with Lady Byron's own conduct.

This rupture produced a sensation in the world of fashion, and the most contradictory rumors prevailed, in the midst of which Byron left England with an expressed resolution never to return. He visited France, the field of Waterloo and Brussels, the banks of the Rhine, Switzerland, and the north of Italy, and for some time took up his abode at Venice. Here he was joined by Mr. Hobhouse, who accompanied him on a visit to Rome, where he completed his third canto of 'Childe Harold.' Not long after appeared 'The Prisoner of Chillon,' 'A Dream, and Other Poems'; and in 1817 'Manfred: a Tragedy,' and 'The Lament of Tasso.' In one of his excursions from Italy he resided for some time at Abydos, and thence proceeded to Tenedos and the island of Scio, where he stayed three months, visiting every classical scene, and frequently sleeping in peasants' cottages, to whom his liberality made him a welcome guest. He also visited several other islands, and at length went to Athens, where he sketched many of the scenes of the fourth and

last canto of 'Childe Harold,' which poem was published in 1818 and sustained the high reputation of the author. In the same year appeared 'Beppo,' in the mixed and pointed manner of the Italian style of poetical humor, and marked by a tone of loose morality which ripened into licentiousness in 'Don Juan.' In 1819 was published the romantic tale of 'Lazeppe,' and the same year was marked by the commencement of 'Don Juan,' which his bookseller, Mr. Murray, declined openly to publish. Of this celebrated production it is as vain to deny the profligacy as the genius. In 1820 was published 'Marino Faliero, Doge of Venice,' a tragedy, written with an avowed attention to the exploded system of the dramatic unities, which too frequently subtracts from the interest all that it gives to more cold and classical qualities; nor did this effort of Byron's prove an exception. In 1821 appeared the drama of 'Sardanapalus,' indisputably the finest of his tragic offspring; 'The Two Foscari,' a tragedy; and 'Cain, a Mystery.' The last is a production of much power, but marked by the same rashness of speculation and recklessness of moral effect which disfigure many of the author's productions.

After leaving Venice Byron resided for some time at Ravenna, then at Pisa, and lastly at Genoa. At Ravenna he became intimate with the Countess Guiccioli, a married lady; and when he removed to Pisa she followed him. Here they lived together openly in the Lanfranchi Palace. It was at Pisa that in 1822, in conjunction with Leigh Hunt, who, on invitation, had become his guest, and Percy Bysshe Shelley, the periodical publication called 'The Liberal,' was commenced, which, principally owing to the unhappy fate of Shelley (who perished by the upsetting of a boat in the Mediterranean), extended only to four numbers. In this work first appeared the 'Vision of Judgment,' caused by the singularly ill-judged performance, under the same title, of Southey. The publisher was prosecuted and fined £100. 'Heaven and Earth, a Mystery,' also first appeared in 'The Liberal.' It is founded on the supposed intercourse between angels and the daughters of earth before the flood, and possesses great force and beauty. The later cantos of 'Don Juan,' with 'Werner,' a tragedy, and 'The Deformed Transformed,' a fragment, close the works of Byron.

In the autumn of 1822 he quitted Pisa and wintered at Genoa, and now began to indulge those feelings, in regard to the efforts of the Greeks to throw off the Mohammedan yoke, which determined him to lend them the aid of his person, purse, and influence. It would also appear by some noble verses which have been printed since his death, that a secret consciousness of his career of action having too long been unworthy of him induced him to seek a nobler species of distinction than one of mere self-engrossment and successful gallantry. In addition to being satiated with dissipation, many circumstances contributed to render Byron an enthusiast for Greece. The associations connected with its illustrious history doubtless served to stimulate his concern for its modern degradation; but these feelings were quickened by an acquaintance with its grand and beautiful scenery, its various races of wild and picturesque manners, and by the personal interest which he had already excited there.

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Whatever may have been the exact combination of motive, in August 1823, he embarked, accompanied by five or six friends, in a British vessel, which he had hired for the purpose, and arrived at the commencement of the third campaign. He established himself some time in Cephalonia, and despatched his friends, Messrs. Trelawney and Hamilton Brown, with a letter to the Greek government. The result of their information induced him to advance £12,000 for the relief of Missolonghi. The dissensions among the Greeks gave him great pain and involved him in considerable difficulties. At length he sailed from Argostoli with two Ionian vessels, and, taking considerable specie on board, proceeded to Missolonghi, where, after considerable hazard and danger, and the loss of one of his vessels, he finally arrived, and was received with every mark of honor Grecian gratitude could devise. His influence was immediately exerted in the mitigation of the ferocity with which the war was waged on the part of the Greeks; but it was much more difficult to produce union among their leaders. He immediately began to form a brigade of Suliotes, 500 of whom were taken into his pay, with a view to an expedition against Lepanto; but such was the disorderly and unsettled temper of these troops, that he was obliged to postpone it.

This unexpected disappointment preyed on his spirits, and 15 February he was attacked with epilepsy. At length the disorder began to yield to medical skill, and he was recommended to remove from the unhealthy Missolonghi to Zante. This step he refused to take. He wrote to a friend:

"I cannot quit Greece while there is a chance of my being even of supposed utility. There is a stake worth millions such as I am, and while I can stand at all I must stand by the cause. While I say this, I am aware of the difficulties, dissensions and defects of the Greeks themselves; but allowance must be made for them by all reasonable people."

On the expedition against Lepanto being given up, other projects were proposed with reference both to military operations and to congresses for uniting eastern and western Greece; but, unhappily, the fatal moment was at hand which was to deprive the Greek cause of its firm and energetic friend. On 9 April Byron contracted a fever which proved fatal. During his illness some fine traits of humanity and feeling for his attendants were exhibited by Byron, and nearly his last words were, "My wife, my child, my sister!—you know all—you must say all."

Thus, in his 37th year, prematurely died this extraordinary genius, to the deep affliction of the people whose cause he had espoused, who decreed every possible public testimony of their sorrow. Nor was his death a subject of less regret to many who looked for a noble recompense in the maturity of his life for the faults of its commencement and subsequent progress. The vices and failings of Byron—undeniable, it is true—were much magnified by the peculiarity of his genius and character, which attracted an intensity of observation to all which concerned him. The morals of Byron, on the score of gallantry, his carelessness of female reputation, and hasty and vindictive spirit of resentment, are altogether indefensible; but it is certain that they were mixed up with great hu-

manity, benevolence, and generosity. It was evident, too, from his death, and many other circumstances, that, whatever his pride and resentment at being so decisively abandoned, he nurtured the natural feelings of a husband and father deep in his bosom. In respect to several disputed points of his conduct, the 'Memoirs,' by himself (which he gave to Moore to raise a loan from Murray, the bookseller, and which that gentleman, at the instance of his family, thought proper to destroy), would doubtless have given much information to the world. As it is, certain journals of visitors, and of temporary companions, professing to record his conversation, but poorly supply their place.

The body of Byron was taken to England, and lay in state in London. It was subsequently interred near his own seat of Newstead Abbey, where a plain marble slab merely records his name and title, date of death, and age. Besides his only legitimate child and heiress, Byron left another daughter in Italy, to whom he bequeathed £5,000 on the condition of her not marrying an Englishman. The successor to his estate and title was his cousin, Capt. George Anson Byron, of the royal navy.

Byron, Harriett, a character in Richardson's novel, 'Sir Charles Grandison.' She was attached to the hero and was the writer of the greater part of the letters comprising the novel.

Byron, Henry James, English dramatist and actor: b. Manchester, January 1834; d. London, 11 April 1884. He studied at first for the medical profession, and afterward for the bar, but his passion for the stage caused him to abandon them. He was the first editor of 'Fun,' and also started another paper entitled the 'Comic Times,' which soon ceased to appear. Many of his chief plays were produced at various theatres with which he was connected as manager, but they were not financially successful. He wrote an immense number of pieces, including a great many farces, burlesques, and extravaganzas, besides comedies or domestic dramas, such as 'Cyril's Success,' probably his best work; 'Dearer than Life'; 'Blow for Blow'; 'Uncle Dick's Darling'; 'The Prompter's Box'; 'Partners for Life'; and 'Our Boys,' which had a run of four years and three months, the longest on record.

Byron, John, English naval officer: b. Newstead, 8 Nov. 1723; d. 10 April 1786. At the age of 17 he sailed with Lord Anson on a voyage round the world, but was wrecked on the coast of the Pacific, north of the Straits of Magellan. Byron, with some of his unfortunate companions, was conducted by the Indians to Chile and remained there till 1744, when he embarked on board a ship of St. Malo and in 1745 returned to Europe. At a subsequent period he published a narrative of his adventures, which is extremely interesting. In 1758 he commanded three ships of the line and distinguished himself in the war against France. George III., who wished to explore the part of the Atlantic Ocean between the Cape of Good Hope and the southern part of America, gave Byron command of a frigate, with which he set sail in June 1764. After having circumnavigated the globe he returned at the end of two years to England, where he arrived in May 1766. Although Byron's voyage was not fruitful in discoveries, it still deserves an

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honorable place in the history of voyages round the world, since he was the first of those renowned circumnavigators of the globe, including Wallis, Carteret, and Cook, whose enterprises were not merely mercantile, but were directed to scientific objects. In 1769 Commodore Byron was appointed to the government of Newfoundland, which he held till 1775. He was raised to the rank of vice-admiral of the white in 1779, and died in 1786. Such was his general ill fortune at sea, that he was called by the sailors "Foul-Weather Jack."

Byron Bay, a bay on the northeastern coast of Labrador, situated about lat. 55° N., and lon. 58° W., and north of Hamilton Inlet. The width of the bay is about 50 miles.

Byron Island, Micronesia, a small island of the Gilbert group, in the Pacific Ocean, about 12 miles in length, abounding in cocoanuts. It was discovered by Commodore Byron in 1765, and belongs to Great Britain.

Byssus, bīs'sūs, a kind of fine flax, and the linen made from it, used in India and Egypt at a very early date. In the latter country it was used in embalming, and mummies are still found wrapped in it. As an article of dress it was worn only by the rich. Dives, in Christ's parable (Luke xvi. 19), was clothed in byssus, and it is mentioned among the riches of fallen Babylon (Rev. xviii. 12). Byssus was formerly erroneously considered as a fine kind of cotton. The fine stuff manufactured from the byssus is called more particularly "sindon." Foster derives the word byssus from the Coptic. Byssus was also used by the ancients, and is still used, to signify the hairlike or threadlike substance (also called the beard), with which different kinds of sea-mussels fasten themselves to rocks. *Pinna marina*, particularly, is distinguished by the length and silky fineness of its beard, from which very durable cloths, gloves, and stockings are still manufactured (mainly as curiosities) in Sicily and Calabria.

Byström, Johan Niklas, Swedish sculptor: b. Filipstad, Wermland, Sweden, 18 Dec. 1783; d. Rome, 11 March 1848. He studied art in Stockholm, and in 1810 went to Rome. In 1815 he returned, and winning the favor of the crown prince by his statue of the latter, received several important commissions. Several years before his death he again took up his residence in Rome. Among his more important works are: 'Drunken Bacchante'; 'Nymph Going into the Bath'; 'Reclining Juno'; 'Hygieia'; 'Dancing Girl'; a statue of Linneus and colossal statues of several of the kings of Sweden.

Byttneriaceæ, büt-ně-rī-ā'sē-ē (or more properly BUTTNERIACEÆ), (after the botanist Buttner), a natural order of exogenous plants, with the following characteristics. Its members are trees or shrubs, with simple alternate leaves and opposite stipules; flowers disposed in clusters, which are axillar or opposite to the leaves; calyx and corolla with five divisions, but the latter sometimes wanting; stamens of the same number as the petals, or double or multiple, in general monadelphous; anthers always two-celled; carpels, from three to five in number, more or less completely united, each cell with two or three ascending ovules or a greater num-

ber; styles free, or more or less united; fruit generally a globular capsule dehiscent or indehiscent. This order is distinguished from the *Malvaceæ* by its two-celled anthers and by the fact that its seeds are generally furnished with a fleshy endosperm. The order is divided into six sub-orders, one of which takes its name from the genus *Byttneria*, which gives its name to the whole order. The chief genus of this sub-order is *Theobroma cacao*, from the seeds of which cocoa is prepared. The genus *Guazuma*, a native of Brazil, belonging to the same sub-order, is cultivated for the sake of its fruit, which is edible and filled with a sweet and pleasant mucilage. Another genus of this sub-order, *Abroma*, is valuable on account of its fibre, from which strong cordage is manufactured. The genus *Astropæa* is said to contain the most beautiful plants; all the species are remarkable for the mucilage they contain.

Byzantine Empire, called also the Roman empire of the East, the Eastern empire, and the Greek empire.

History.—On the death of Theodosius the Great, 395 A.D., the division of the great Roman empire into East and West became permanent. The eastern portion, with Constantinople, the ancient Byzantium, for its capital, was bequeathed to the elder son Arcadius, with whom the line of Byzantine emperors properly commences. During his minority Rufinus was his guardian and minister, between whom and Stilicho, the minister of the Western empire, a fierce rivalry existed. The Goths laid waste Greece. Eutropius, the successor, and Gainas, the murderer of Rufinus, were ruined by their own crimes. The latter lost his life in a civil war excited by him (400). Arcadius and his empire were now ruled by his proud and covetous wife Eudoxia, till her death (404). The Isaurians and the Huns wasted the provinces of Asia and the country along the Danube. Theodosius the Younger succeeded his father (408), under the guardianship of his sister Pulcheria. Naturally of an inferior mind, his education had made him entirely imbecile and unfit for self-command. Pulcheria, who bore the title of Augusta, administered the kingdom ably. Of the Western empire, which had been ceded to Valentinian, Theodosius seized upon West Illyria (423). The Greeks fought with success against the king of the Persians, Varanes. The kingdom of Armenia, thrown into confusion by internal dissensions, and claimed at the same time by the Romans and the Persians, became now a bone of contention between the two nations (440). Attila laid waste the dominions of Theodosius, and obliged him to pay tribute (447). After the death of her brother Pulcheria was acknowledged empress (450). She was the first female who attained this dignity, and giving her hand to the senator Marcian, raised him to the throne. His wisdom and valor averted the attacks of the Huns from the frontiers, but he did not support the Western empire in its wars against the Huns and the Vandals with sufficient energy, and afforded shelter to a part of the Germans and Sarmatians who were driven to the Roman frontiers by the incursions of the Huns. Pulcheria died before him in 453. Leo I. (457), a prince praised by contemporary authors, was chosen successor of Marcian. His expeditions

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against the Vandals (467) were unsuccessful. His grandson Leo II. succeeded, but survived only a few months, when Zeno, the father of Leo, who had previously been appointed his colleague, became sole emperor (474). The government of this weak emperor, who was hated by his subjects, was disturbed by rebellions and internal disorders of the empire. The Goths depopulated the provinces till their king Theodoric turned his arms against Italy (489). Ariadne, widow of Zeno, raised the minister Anastasius, whom she married, to the throne (491). The nation, once excited to discontents and tumults, could not be entirely appeased by the alleviation of their burdens and by wise decrees. The forces of the empire, being thus weakened, could not offer an effectual resistance to the Persians and the Bulgarians along the Danube. To prevent their incursions into the peninsula of Constantinople, Anastasius built the long wall, as it is called. After the death of Anastasius the soldiers proclaimed Justin emperor (518). Notwithstanding his low birth he maintained possession of the throne. Religious persecutions, undertaken at the instigation of the clergy, and various crimes, into which he was seduced by his nephew Justinian, disgrace his reign. He was renowned as a legislator, and his reign was distinguished by the victories of his general Belisarius; but how unable he was to revive the strength of his empire was proved by its rapid decay after his death. Justin II., his successor (565), was an avaricious, cruel, weak prince, governed by his wife. The Longobardi (Lombards) tore from him part of Italy (568). His war with Persia, for the possession of Armenia (570), was unsuccessful; the Avari plundered the provinces on the Danube, and the violence of his grief at these misfortunes deprived him of reason. Tiberius, his minister, a man of merit, was declared Cæsar, and the general, Justinian, conducted the war against Persia with success. The Greeks now allied themselves, for the first time, with the Turks. Against his successor, Tiberius II. (578), the Empress Sophia and the general Justinian conspired in vain. From the Avari the emperor purchased peace; from the Persians it was extorted by his general, Mauritius or Maurice (582), who, after the death of Tiberius in the same year, was declared his successor. Mauritius, under other circumstances, would have made an excellent monarch, but, for the times, wanted prudence and resolution. He was indebted for the tranquillity of the eastern frontiers to the gratitude of King Chosroes II., whom, in 591, he restored to the throne, from which he had been deposed by his subjects. Nevertheless, the war against the Avari was unsuccessful, through the errors of Commeniolus. The army was discontented, and was irritated now by untimely severity and parsimony, and now by timid indulgence. They finally proclaimed Phocas, one of their officers, emperor. Mauritius was taken in his flight and put to death (602). The vices of Phocas and his incapacity for government produced the greatest disorder in the empire. Heraclius, son of the governor of Africa, took up arms, conquered Constantinople, and caused Phocas to be executed (610). He distinguished himself only in the short period of the Persian war. During the first 12 years of his reign the Avari,

and other nations of the Danube, plundered the European provinces, and the Persians conquered the coasts of Syria and Egypt. Having finally succeeded in pacifying the Avari, he marched against the Persians (622), and defeated them; but during this time the Avari, who had renewed the war, made an unsuccessful attack on Constantinople in 626. Taking advantage of an insurrection of the subjects of Chosroes, he penetrated into the centre of Persia. By the peace concluded with Siroes (628), he recovered the lost provinces and the holy cross. But the Arabians, who now became powerful under Mohammed and the caliphs, conquered Phœnicia, the countries on the Euphrates, Judea, Syria, and all Egypt (635-641). Among his descendants there was not one able prince. He was succeeded by his son Constantine III., probably in conjunction with his stepbrother Heracleonas (641). The former soon died, and the latter lost his crown in a rebellion, and was mutilated. After him Constans, son of Constantine, obtained the throne (642). His sanguinary spirit of persecution, and the murder of his brother Theodosius (650), made him odious to the nation. The Arabians, pursuing their conquests, took from him part of Africa, Cyprus, and Rhodes, and defeated him even at sea (653). Internal disturbances obliged him to make peace. After this he left Constantinople, and in 663 began an unsuccessful war against the Lombards in Italy. He died at Syracuse in 668. Constantine IV., Pogonatus, son of Constans, vanquished his Syracusan competitor Mezentius, and, in the beginning of his reign, shared the government with his brothers Tiberius and Heraclius. During the early part of his reign the Arabians inundated all Africa and Sicily, penetrated through Asia Minor into Thrace, and attacked Constantinople, for several successive years, by sea. Nevertheless, he made peace with them on favorable terms. But on the other hand, the Bulgarians obliged him to pay a tribute (680). Justinian II., his son, who succeeded him in 685, weakened the power of the Maronites, but fought without success against the Bulgarians and against the Arabians. Leontius dethroned this cruel prince, and after mutilating, banished him to the Tauric Chersonese (695). Leontius was dethroned by Apsimar, or Tiberius III. (698), who was dethroned by Trebelius, king of the Bulgarians, who restored Justinian (705); but Philippicus Bardanes rebelled anew. With Justinian II. the race of Heraclius was extinguished. The only care of Philippicus was the spreading of Monothelism, while the Arabians wasted Asia Minor and Thrace. Philippicus reigned from 711 to 713, when he was deposed by Anastasius, who at the end of three years retired to a monastery, the army sent out against the Arabians having revolted against him, and proclaimed their leader, Theodosius, emperor. This prince, known as Theodosius III., after a reign of only 14 months, was compelled in his turn to yield the throne to Leo the Isaurian, general of the army of the East, who refused to recognize him, and marched against Constantinople (May 717). Leo repelled the Arabians from Constantinople, which they had attacked for almost two years, and suppressed the rebellion excited by Basilus and the former emperor Anastasius. From 726 the abolition of the worship of images absorbed his attention, and the Italian provinces were al-

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lowed to become a prey to the Lombards, who thus put an end to the exarchate of Ravenna (728), while the Arabians plundered the eastern provinces. After his death (741), his son Constantine V. ascended the throne—a courageous, active, and noble prince. He vanquished his rebellious brother-in-law Artabases, wrested from the Arabians part of Syria and Armenia, and overcame at last the Bulgarians, against whom he had been long unsuccessful. He died (775), and was succeeded by his son Leo IV., who fought successfully against the Arabians, and this latter by his son Constantine VI. (780), whose imperious mother, Irene, his guardian and associate in the government, raised a powerful party by the restoration of the worship of images. He endeavored, in vain, to free himself from the dependence on her and her favorite, Stauratius, and died in 797, after having had his eyes put out. The war against the Arabians and Bulgarians was long continued; against the first it was unsuccessful. The design of the empress to marry Charlemagne excited the discontent of the patricians, who placed one of their own order, Nicephorus, upon the throne (802). Irene died in a monastery. Nicephorus became tributary to the Arabians, and fell in the war against the Bulgarians (811). Stauratius, his son, was deprived of the crown by Michael I., and he, in turn, by Leo V. (813). Leo was dethroned and put to death by Michael II. (820). During the reign of the latter the Arabians conquered Sicily, Lower Italy, Crete, and other countries. He prohibited the worship of images, as did also his son Theophilus (829-42). Theodora, widow of Theophilus and guardian of his son Michael III., put a stop to the dispute about images (842). During a cruel persecution of the Paulicians, considered to be an offshoot of the Manichæans, the Arabians devastated the Asiatic provinces. The dissolute and extravagant Michael confined his mother in a monastery. The government was administered in his name by Bardas, his uncle, and after the death of Bardas by Basil, by whom Michael was put to death (867). Basil I., who came to the throne in 867, was not altogether a contemptible monarch. He died 886. The reign of his learned son, Leo VI. (the Philosopher), was not very happy. He died 911. His son, Constantine VII., Porphyrogenitus (that is, "born in the purple"), a minor when he succeeded his father, was placed under the guardianship of his colleague, Alexander, and after Alexander's death, in 912, under that of his mother Zoe. Romanus Lacapenus, his general, obliged him, in 919, to share the throne with him and his children, Constantine VIII. and Stephanus. Constantine subsequently took sole possession of it again, and reigned mildly, but weakly. His son, Romanus II., succeeded him in 959, and fought successfully against the Arabians. To him succeeded, in 963, his general Nicephorus II. (Phocas), who was put to death by his own general, John Zimisce (969), who carried on a successful war against the Russians. Basil II., son of Romanus, succeeded this good prince in 976. He vanquished the Bulgarians and the Arabians. His brother, Constantine IX. (1025), was not equal to him. Romanus III. became emperor (1028) by marriage with Zoe, daughter of Constantine. This dissolute but able princess caused her husband to be executed, and successively raised to the throne

Michael IV. (1034), Michael V. (1041), and Constantine X. (1042). Russians and Arabians meanwhile devastated the empire. Her sister Theodora succeeded her on the throne (1054). Her successor, Michael VI. (1056), was dethroned by Isaac Comnenus in 1057, who became a monk (1059). His successor, Constantine XI. Ducas, fought successfully against the Uzes. Eudocia his wife, guardian of his sons, Michael, Andronicus, and Constantine, was intrusted with the administration (1067), married Romanus IV., and brought him the crown. He carried on an unsuccessful war against the Turks, who kept him for some time prisoner. Michael VII., son of Constantine, deprived him of the throne (1071). Michael was dethroned by Nicephorus III. (1078), and the latter by Alexius I., Comnenus (1081). Under his reign the Crusades commenced. His son, John II., came to the throne (1118), and fought with great success against the Turks and other barbarians. The reign of his son, Manuel I., who succeeded him (1143), was also not unfortunate. His son, Alexius II., succeeded (1180), and was dethroned by his guardian, Andronicus (1183), as was the latter by Isaac (1185). After a reign disturbed from without and within, Isaac was dethroned by his brother Alexius III. (1195). The Crusaders restored him and his son, Alexius IV.; but the seditious Constantinopolitans proclaimed Alexius V., Ducas Murzuphlus, emperor, who put Alexius IV. to death. At the same time Isaac II. died. During the last reigns the kings of Sicily had made many conquests on the coasts of the Adriatic. The Latins now forced their way to Constantinople (1204), conquered the city, and retained it, together with most of the European territories of the empire. Baldwin, Count of Flanders, was made emperor; Boniface, Marquis of Montferrat, obtained Thessalonica as a kingdom, and the Venetians acquired a large extent of territory. In Attalia, Rhodes, Philadelphia, Corinth, and Epirus, independent sovereigns arose. Theodore Lascaris seized on the Asiatic provinces, in 1206 made Nice (Nicaea) the capital of the empire, and was at first more powerful than Baldwin. In 1204 a descendant of the Comneni, named Alexius, established a principality at Trebizond, in which his great-grandson John took the title of emperor. Neither Baldwin nor his successors were able to secure the tottering throne. He himself died in captivity among the Bulgarians (1206). He was followed first by Henry, his brother, then by Peter, brother-in-law of Henry (1217), and then by Robert of Courtenay, son of Peter, who succeeded in 1219, but was not crowned till 1221. With the exception of Constantinople, all the remaining Byzantine territory, including Thessalonica, was conquered by John, emperor of Nice. Baldwin II., brother of Robert, succeeded and reigned under the guardianship of his colleague, John of Brienne, king of Jerusalem, till 1237, after which he was sole ruler till 1261. In that year Michael Palæologus, king of Nice, conquered Constantinople, and Baldwin died in the West, a private person. The sovereigns of Nice, up to this period were Theodore Lascaris (1206); John Ducas Vatatzes, a good monarch and successful warrior (1222); Theodore II., his son (1254); John Lascaris (1259), who was deprived of the crown by Michael Palæologus in December

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1259, who himself received the crown 1 Jan. 1260. In 1261 Michael took Constantinople from the Latins. He labored to unite himself with the Latin Church, but his son, Andronicus II. (1282), renounced the connection. Internal disturbances and foreign wars, particularly with the Turks, threw the exhausted empire into confusion. Andronicus III., his grandson, obliged him to divide the throne, and at length wrested it entirely from him (1328). He waged war unsuccessfully against the Turks, and died in 1341. His son, John Palæologus, was obliged to share the throne with his guardian, John Cantacuzene, during the first years of his reign. The son of the latter, Matthew, was also made emperor. But John Cantacuzene resigned the crown, and Matthew was compelled to abdicate (1355), when John Palæologus, the son of Andronicus III., became sole emperor. Under his reign the Turks first obtained a firm footing in Europe, and conquered Gallipoli (1357). The family of Palæologus from this time were gradually deprived of their European territories, partly by revolt, partly by the Turks. The Sultan Amurath took Adrianople (1361). Bajazet conquered almost all the European provinces except Constantinople, and obliged John to pay him tribute. The latter was, some time after, driven out by his own son, Andronicus, who was succeeded by his second son, Manuel (1391). Bajazet besieged Constantinople, defeated an army of western warriors under Sigismund, king of Hungary, near Nicopolis (1396), and Manuel was obliged to place John, son of Andronicus, on the throne. Timur's invasion of the Turkish provinces saved Constantinople for this time (1402). Manuel then recovered his throne, and regained some of the lost provinces from the contending sons of Bajazet. To him succeeded his son John, Palæologus II. (1425), whom Amurath II. stripped of all his territories except Constantinople, and laid under tribute (1444). To the Emperor John succeeded his brother Constantine Palæologus. With the assistance of his general, Justinian, a Genoese, he withstood the superior forces of the enemy with fruitless courage, and fell in the defense of Constantinople, by the conquest of which (29 May 1453) Mohammed II. put an end to the Greek or Byzantine empire. In 1461 David Comnenus, emperor of Trebizond, submitted to him, and at a subsequent period was put to death. See Gibbon, 'Decline and Fall of the Roman Empire'; Pears, 'Fall of Constantinople' (1885); 'Bury, 'The Later Roman Empire' (1889); Oman, 'Byzantine Empire' (1892); Harrison, 'Byzantine History in the Early Middle Ages' (1900).

Byzantine Literature.—The Greek literature of the period of the Byzantine empire is almost entirely destitute of originality, and derives importance almost entirely from the mass of valuable historical material embodied in it. Among the historians proper the more notable are Procopius of Cesarea; Agathias, who wrote an account of Justinian's reign; Nicephorus Gregoras; Anna Commena, daughter of the Emperor Alexius I., author of a highly laudatory life of her father; Pachymerus; George Codinus; Constantine VII., Porphyrogenitus, from whom we have many works on history, law, politics, and science; John Cantacuzenus, emperor and historian; and at the very end of the period, Michael Ducas. Poetry, in the proper

sense of the word, can scarcely be said to have existed at all. Theodorus Prodromus, who flourished in the later 12th century, is the chief of the versifiers, among his works being a long romance having Rhodanthe and Dosikles as its heroine and hero, some dramas, historical poems, epistles, etc. Georgius of Pisidia, in the early 7th century, wrote war poems; Nicetas Eugenianus, a contemporary of Prodromus, wrote a work in imitation of the latter's romance; and among other writers of verse were Theodosius, of the latter half of the 10th century, Tzetzes and Joannes Pegasus, the latter two being better known as annotators of the Greek classical writers. Manuel Philes of Ephesus (about 1280–1330) has left many dramas; and we have hymns from Germanus, a patriarch of Constantinople; Theodorus Studites; Porphyrogenitus; Cosmas, an 8th-century writer; Joannes Damascenus (John of Damascus); and Theophanes Ho Graptos. Among writers of grammatical and similar works the most notable are Tzetzes (about 1180), who annotated Homer, Hesiod, Æschylus, and especially Aristophanes; Eustathius, archbishop of Myra in Lycia in 1174, best known for his commentary on Homer; Manuel Moschopolus, a 13th-century scholiast; Joannes Pegasus, of the latter part of the 14th century, chiefly known for his scholia on Hesiod's poems; and Demetrius Triclinius, a scholiast contemporary with Pegasus. Their work is less valuable in itself than as a link with the more reliable work of their predecessors, or as containing much that would, but for them, have been lost to us. Of the lexicographers Suidas, who lived during the 10th century, is much the most important; but the works of Photius in this department are also of value. Joannes Doxopater, of the later 11th century, wrote on rhetoric; and in the department of philosophy we find the names of Michael Bellus the younger (about 1018–1105), who also wrote historical and other works, and Joannes Italus. The theologians include Joannes Damascenus, already mentioned, author of *Sacra Parallela*, a collection of passages from the fathers; and Nicephorus Callistus, a 14th-century writer on ecclesiastical history.

Byzantine Art.—The style which prevailed in the Byzantine empire, and which arose after Constantine the Great had made Byzantium the capital of the Roman empire (330 A.D.), and had ornamented that city, which was renamed after him, with all the treasures of Grecian art. (See CONSTANTINE.) One of the chief influences in Byzantine art was Christianity, and to a certain extent Byzantine art may be recognized as the endeavor to give expression to the new elements which Christianity had brought into the life of men. The tendency toward Oriental luxuriance and splendor of ornament now quite supplanted the simplicity of ancient taste. Richness of material and decoration was the aim of the artist rather than purity of conception. Yet the classical ideals of art and in particular the traditions of technical processes and methods carried to Byzantium by the artists of the Western empire, held their ground long enough, and produced work pure and powerful enough, to kindle the new artistic life which began in Italy with Cimabue and Giotto.

With regard to sculpture the statues no longer displayed the freedom and dignity of an-

cient art. The true proportion of parts, the correctness of the outlines, and in general the severe beauty of the naked figure, or of simple drapery in Greek art, were neglected for extravagant costume and ornamentation and petty details. Yet in the best period of Byzantine art, from the 6th to the 11th century, there is considerable spiritual dignity in the general conception of the figures. But sculpture was of second-rate importance at Byzantium, the taste of those times inclining more to mosaic work with the costliness and brilliant colors of its stones. The first germ of a Christian style of art was developed in the Byzantine pictures. The artists, who appear to have seldom employed the living model, and had nothing real and material before them, but were obliged to find, in their own imaginations conceptions of the external appearance of sacred persons, such as the mother of Christ, or the apostles, could give but feeble renderings of their ideas. As they cared but little for a faithful imitation of nature, but were satisfied with repeating what was once acknowledged as successful, it is not strange that certain forms, approved by the taste of the time, should be made, by convention, and without regard to truth and beauty, general models of the human figure, and be transmitted as such to succeeding times. In this way the artists in the later periods did not even aim at accuracy of representation, but were contented with stiff general outlines, lavishing their labor on ornamental parts.

Byzantine Architecture.—This may be said to have assumed its distinctive features in the church of St. Sophia built by Justinian in the 6th century, and still existing as the chief mosque in Constantinople. It is more especially the style associated with the Greek Church as distinguished from the Roman. The leading forms of the Byzantine style are the round arch, the circle, and in particular the dome. The last is the most conspicuous and characteristic object in Byzantine buildings, and the free and full employment of it was arrived at when by the use of pendentives the architects were enabled to place it on a square apartment instead of a circular or polygonal. In this style of building incrustation, the masking or covering of brick surfaces with more precious materials, was largely in use. It depended much on color and surface ornament for its effect, and with this intent mosaics wrought on grounds of gold or of positive color are profusely introduced, while colored marbles and stones of various kinds are made much use of. The capitals are of peculiar and original design, the most characteristic being square and tapering downward, and they are very varied in their decorations. Byzantine architecture may be divided into an older and a newer (or Neo-Byzantine) style. The most distinctive feature of the latter is that the dome is raised on a perpendicular circular or polygonal piece of masonry (technically the drum) containing windows for lighting the interior, while in the older style the light was admitted by openings in the dome itself. The Byzantine style had a great influence on the architecture of western Europe, especially in Italy, where St. Mark's in Venice is a magnificent example, as also in Sicily. It had also material influence in southern France and western Germany. See Texier and Pullan, 'Byzantine Architecture' (1884); Pulger, 'Les anciens

églises Byzantines de Constantinople' (1878); Kondakoff, 'Histoire de l'art Byzantin' (1886-91); Bayet, 'L'Art Byzantin' (1892).

Byzantium, bī-zān'shī-ūm, the name of the city of Constantinople before its name was changed by Constantine the Great. It was founded by a colony of Greeks from Megara, who, under a leader named Byzas, settled on what seemed a favorable spot at the entrance to the Thracian Bosphorus, in 658 B.C. The city which was built by the first colonists was named after their leader. Other colonists followed from different quarters, especially from Miletus, and Byzantium was already a flourishing town when it was taken and sacked by the Persians, in the reign of Darius, the son of Hystaspes. After the retreat of the Persians (479 B.C.) Byzantium soon recovered itself. During the Peloponnesian war it acknowledged for some time the supremacy of the Athenians, but afterward fell away. Alcibiades recovered it for Athens (409), but it was taken by Lysander in 405. At a later period the Byzantines received support from Athens in their resistance against Philip of Macedon. The barbarian Thracians, who occupied the neighboring territory, and the Celts (Galatians), in their migrations to the East, often appeared to threaten the safety of the town; but in spite of this, chiefly owing to its favorable position for commerce, it continued to prosper, and survived the decay of most of the other Greek cities; and even under the Romans it was left free to manage its own affairs, and was allowed to demand dues from all ships passing through the Bosphorus, only part of these being claimed by the Romans. At the end of the 2d century of the Christian era Byzantium, unfortunately for itself, sided with Pescennius Niger against Septimius Severus. By the latter it was besieged for three years, and when at last it was forced to surrender Severus ordered its walls to be razed to the ground, deprived the city of its privileges, and placed it under the jurisdiction of the Perinthians. For a time the prosperity of the city was annihilated, until a new and more brilliant era began for it under Constantine the Great. (See CONSTANTINE; CONSTANTINOPLE.) Its early form of government was that of an aristocracy, which passed into an oligarchy. In the year 390 B.C. it received from Thrasybulus a democratical constitution, closely resembling that of the Athenians. Byzantium was the great entrepôt for the grain trade between the countries bordering on the Black Sea and those bordering on the Ægean.

Bzovius, Abraham (Pol. *Bzowski*), Polish scholar and divine: b. Proszowice, near Miechow, 1567; d. Rome, 31 Jan. 1637. At the request of Pope Paul V., he spent several years of the latter part of his life in the Vatican, as librarian of the *Virgilio dei Ursini*, and actively engaged in literary pursuits. He was a member of the order of the Dominicans, one of the most voluminous writers of his age, gained for himself a high reputation as professor of philosophy and theology at Milan and Bologna, and crowned the labors of his life by continuing the celebrated ecclesiastical annals of Cæsar Baronius, who had left them off at the year 1198, and completed only 12 volumes. Bzovius carried them to the year 1532, in 9 volumes.

C

C the third character of the English alphabet and of all the alphabets derived from the Latin. In its form it is a modification of the primitive Greek *gamma*. That primitive form was <, an angle with vertex pointing to the left; it is the reverse of the ancient Phœnician 7, which points to the right, and of the Old Hebrew *gimel*, 7. The Latin **C** (used also by the Greeks to some extent) is the ancient Greek < rounded, just as the later Greek *gamma* symbol, Γ, is the angular symbol erected. The Russian alphabet retains the Greek symbol Γ, but its place is fourth, because in that alphabet the sign for the denti-labial V holds the third place. The Greek *gamma* (<, Γ,) seems to have always represented the same sonant guttural as the English *g* in "go." To express the corresponding mute guttural the Greeks attached the < to an upright line, |, making K. In the Latin alphabet of the Romans, as represented in their earliest inscriptions, the C stood for the same sonant guttural as in the Greek, *g* hard; for example, *lecio*, later written *legio*; *macistratus*, later *magistratus*; yet at the same time the C represented also the surd guttural K, as it still does in English except before the vowels *e* and *i* and the diphthongs *æ* and *œ* in words from the Latin. Thus the early Latin alphabet was without the symbol K. There is in this use of the character C in ancient Roman epigraphy ground for the inference that the early Romans confounded the two gutturals *k* and *g* hard, as in some localities or in some classes of people the termination *ing* becomes *ink*, and "something" becomes "somethink." But at a later period the distinction between *g* hard and *k* was recognized, and then for the designation of the mute guttural the *kappa* (K) of the Greek alphabet came into use in Latin writing. But the *k* was afterward rejected, and its only use in Latin was in writing the word *kalendæ* (abbreviated to *kal.* or *k.*) and as an abbreviation of *Carthago* (Carthage) and of the personal name *Cæso*. No doubt the persistence of *k* in *kalendæ* was due to the adherence of the Pontifices to the antique forms of the official calendars; and the K standing for the forename *Cæso* was retained as a means of abbreviating that name and distinguishing it from the abbreviation of the name Caius: C. Julius Cæsar is Caius, but K. Fabius Ambustus is Cæso. But the *k* having been discarded from the Latin alphabet, its function was assigned to the symbol C, while for representation of the sonant guttural a modified form of C was adopted, namely, the G with the value of *g* in "go." The soft *g*, equal to *j*, was probably unknown to the Romans before the general debasement of the Latin language. After the symbol *k* had been discarded and been

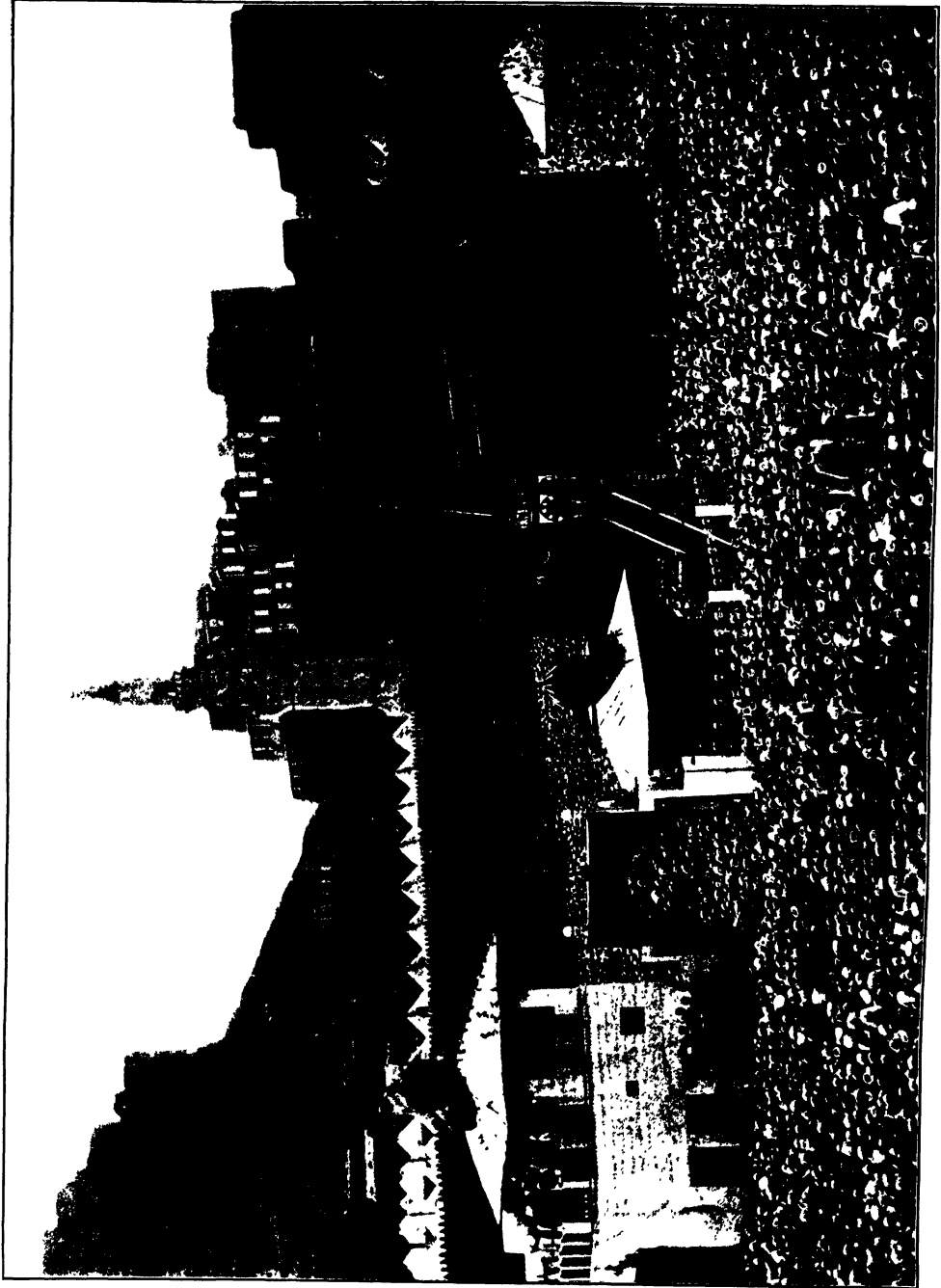
superseded by C, the symbol C, with the power of *gamma*, was retained as an initial abbreviation of Gaius, name for a man, and of Gaia (with C reversed 3), name of a woman. C was also retained in the formula Cn. as an abbreviation of Gnæus. This use of the initial C as representing *g* hard (sonant guttural) recalls the primitive equivalence for the Romans of the two gutturals *k* and *g* hard; but the modern Latinists, unacquainted with such use of C, have usually pronounced Caius "Kaius" and Cnæus "Knæus," instead of "Gæus" and "Gnæus." In the Anglo-Saxon, its alphabet having been derived from the Latin, the C had everywhere the value of K, and the same is to be said of the Gælic; that fact gives presumptive proof that at the first contact of the Gælic and Germanic races with men of Latin speech the C in all situations was equivalent to *k* in Latin; and the German word Kaiser is proof that when the Germans first heard of Julius and the Cæsars who succeeded him the head of the Roman state was "*Kaisar*," not "*Cæsar*." The change in the pronunciation of C from *k* to *s*, as in French and English; to *ch* as in Italian, to *ts* as in German, appears to have come about long after the fall of the Roman empire.

Ca Ira, sä ē-ra, a popular song of the great French Revolution. The origin and date of this song are both uncertain, and there are various versions of the words claiming to be original. In all probability it dates from May or June 1790. French writers say that Benjamin Franklin, in speaking of the American Revolution, frequently used the expression "*Ça ira*" ("it will succeed"). The French republicans caught up the phrase, and "consecrated" it to their own revolution in a popular hymn. The air to which it was adapted was a popular *carillon*, a favorite one with Marie Antoinette. The refrain or chorus of one of the versions runs thus:—

"Ah ! ça ira, ça ira, ça ira,
En dépit d' l'aristocrat' et d' la pluie,
Ah ! ça ira, etc.
Nous nous mouillerons, mais ça finira,"

referring to the rain which fell during the taking of the Bastille.

Caaba, kâ'ba, or kâ'a-ba, or **Kaaba**, properly a quadrangular structure, applied particularly to a celebrated temple at Mecca. According to Mussulman tradition, the first Caaba was built by the angels on the model of the pavilion which surrounds the throne of the Most High; the second was built by Adam, with whom it was removed to the skies, where it still exists in a right line above the Caaba of Mecca; the third was built by Seth, but perished in the deluge; the fourth, which now exists, was built



PILGRIMS AROUND THE KAABA.

by Abraham and Ishmael. The name is specially given to a small cubical oratory in the temple in the centre of a large space surrounded by galleries. This is the point toward which the prayers of all Mussulmans are directed. On one of its sides is inwrought the famous oval black stone, believed to be one of the precious stones of paradise, and to have been brought by the angel Gabriel to Abraham, when he was constructing the Caaba. At first, according to one version, of a dazzling whiteness, the Moslems say that it grieved and wept so long for the sins of the human race that it became gradually opaque, and at length absolutely black; or, in another version, that it has been blackened by the tears of pilgrims, shed for sin. It is an object of profound veneration to the pilgrims who resort to the sacred city. This inner Caaba is surrounded with a veil of black silk, and is opened but two or three times a year, and none but the faithful are permitted to approach it. The temple of the Caaba is older than the time of Mohammed, previous to whom it was the Arab pantheon, containing the nation's idols.

Caaing-whale, *kā-ing hwāl*, one of several species of porpoise-like cetaceans of the Killer family (*Orcidae*), characterized by its globose head; properly *Globiocephalus melas*, of the North Atlantic Ocean. It is from 16 to 24 feet long, 10 feet in diameter at its thickest part, and weighs between 5,000 and 6,000 pounds. Its pectoral fins are about 5 feet long and 18 inches broad, and its dorsal fin is very low. With the exception of a white streak, which begins in the form of a heart under the throat and gradually narrows to the vent, the whole of the body is of a glossy black color, and hence the fish is frequently known as the blackfish (q.v.) or black dolphin. The teeth are arranged at considerable distances in the upper and under jaw in such a manner that those of the upper jaw fit into the spaces left in the lower jaw, and conversely. Their number is very variable. They are conical in shape, strong, rather long, and end in a point which is a little curved backward and inward. The caaing-whale is very abundant and very widely distributed. It is found in the whole of the Arctic Ocean, and also in the German, Atlantic, and Pacific oceans, and even in the Mediterranean Sea. It is remarkable for its gregarious habits, being often found in schools numbering several hundreds, which are led by an old and experienced male whom, it is said, they never abandon. On this account its pursuers always endeavor to force the leader on shore, and when this is accomplished all the rest follow him and are likewise stranded—hence the Scotch name "caaing," equivalent to "driving." In the stomachs of these animals are usually found the remains of cod-fishes and various species of cuttle-fish, as well as of herrings, ling, and other fishes. The caaing whale is pursued chiefly on account of the oil which it yields.

Caama, *kā'ma*. See HARTBEEST.

Cab, a carriage with two or four wheels, usually drawn by one horse, and plying for hire; a hackney-carriage. One well-known two-wheeled variety is the hansom, named after the inventor. Public cabriolets—hooded chaises carrying one person besides the driver—were introduced in London in 1823, and the name was soon after shortened to cab. See COACH; HACKNEY-CARRIAGE.

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Cabal', an English ministry under Charles II. (1667-73), composed of Clifford, Ashley, Buckingham, Arlington, and Lauderdale, the initials of whose names form this word, whence perhaps its use as a designation. But the use of this word to signify a body of intriguers was not originally derived from this circumstance, as sometimes supposed, for the word *cabale*, derived from *cabala* (q.v.), was used in that sense in French before this time.

Cab'ala, or **Cabbala** (reception), is used by the Jews to denote sometimes the traditions of their ancestors regarding the interpretation of the Scriptures; sometimes, and most commonly, their mystical philosophy. The opinions of scholars respecting the origin of the Cabalistic philosophy are very various. The Jews derive the Cabala from the most ancient times of their nation, nay, even from Adam himself. But Cabalistic doctrines in reality seem to have had their origin about 200 years before Christ, and were derived from the mingling of Oriental ideas with those belonging to the Mosaic religion that was the result of the captivity. It was long before the Cabala reached its full development, however, the chief landmarks in its history being the writings of Philo Judæus and the appearance of the books called the *Sefer Jezirah*, 'Book of Creation,' and the *Sefer Zohar*, 'Book of Light.' The age of both is doubtful. The earliest probable date for the *Sefer Jezirah* is the beginning of our era. The earliest mention of the *Sefer Zohar* is in 1290, and the author is not supposed to have lived much before 1000. The Cabala is divided into the symbolical and the real. The symbolical portion treats principally of letters, to which it gives mystical significations. The real, which is opposed to the symbolical, and comprehends doctrines, is divided into the theoretical and the practical. The aim of the theoretical is to explain the Scriptures according to the secret traditions, and to form therefrom a philosophical system of metaphysics, physics, and pneumatology. The practical portion, on the other hand, pretends to teach the art of performing miracles, and that merely by an artificial application of the divine names and sentences in the Scriptures. After the revival of science many scholars studied the Cabala. The most famous modern Cabalists are Henry More and Christian Knorr, the latter of whom published a compilation of the most important parts of the Cabalistic writings in Latin (1677).

Caballero, **Fernan**, *fēr-nan' kā-ba-lyá'rō*, pseudonym of CECILIA BÖHL VON FABER, Spanish novelist, daughter of a German settled in Spain and married to a Spanish lady: b. Morges, near Lausanne, Switzerland, 25 Dec. 1796; d. Seville, 7 April 1877. Brought up in Germany, she went to Cadiz with her father in 1813. Her first novel, 'La Gaviota,' appeared in 1849, and was followed by 'Elia,' 'Clemencia,' 'La Familia de Alvareda,' etc., as well as by many shorter stories. In 1859 she published a collection of folk-tales under the title, 'Cuentas y Poesías Populares Andaluces.' Some of her works have appeared in English translations, including 'La Gaviota' (translated as 'The Sea-Gull,' 1867); 'Elia: or Spain Fifty Years Ago' (1868); 'Air-Built Castles'; and 'The Bird of Truth' (1881). The chief charm of her writings lies in her descriptions of life and nature in Andalusia. She was three times left a widow; her last hus-

band was a lawyer named De Arrom. She forms the subject of one of the 'Six Life Studies' (1880) of M. B. Edwards.

Cabanel, Alexandre, ä-lëks-ändr kä-ba-nël, French artist: b. Montpellier, 28 Sept. 1823; d. Paris, 23 Jan. 1889. He studied with Picot, and after 1860 gave himself mainly to portrait painting. He was for many years a professor of the Académie des Beaux Arts and was especially popular with American patrons. Among his many portraits of Americans is that of Miss Catherine Wolfe, now in the Metropolitan Museum, New York, which contains also his 'Queen Vashti and King Ahasuerus,' and 'Birth of Venus.' See Stranahan, 'A History of French Painting' (1899).

Cabanis, Jean Louis, zhôn loo-e kä-ba-nës, German ornithologist: b. Berlin, 1816. He made an ornithological tour through North and South Carolina, 1839-41, and in 1849 became custodian of the ornithological department of the Berlin Zoological Museum. His investigations were largely instrumental in establishing a natural classification, and were published in Wiegmann's 'Archiv für Naturgeschichte' (1847), and in the 'Museum Heineum' (1850-63). Cabanis founded the 'Journal für Ornithologie' in 1853.

Cabanis, Pierre Jean Georges, pë-är zhôn zhörzh, French physician and philosopher: b. Cosnac, department of Charente-Inférieure, 5 June 1757; d. Rueil, near Paris, 5 May 1808. In his 16th year he went to Warsaw as secretary of a Polish lord, where the proceedings of the stormy Diet of 1773 filled him with melancholy and contempt of mankind. He began at Paris a complete translation of the 'Iliad'; became acquainted with Madame Helvetius, and through her with Holbach, Franklin, and Jefferson, and became the friend of Condillac, Turgot, and Thomas. In his 'Serment d'un Médecin' he formally took leave of the belles-lettres. He professed the principles of the Revolution, and was intimately connected with Mirabeau, who made use of his ideas, and obtained from him the work on public education which Cabanis published himself in 1791, after the death of Mirabeau. He lived in still closer intimacy with Condorcet. At the time of his death he was a member of the Senate. His 'Rapports du Physique et du Moral de l'Homme' (1882), improved, is his most important work. It displays considerable power of analysis, and advocates the most extreme materialistic doctrines.

Cabat, Nicolas Louis, nîk-ô-lä loo-e kä-ba, French artist: b. Paris, 1812; d. 1893. He studied with Flers and became prominent among painters of the landscape realistic school. Among his works are 'Pond at Ville d'Avray' (1834); 'A Spring in the Wood' (1864); and 'A Morning in the Park of Magnet' (1877).

Cab'bage, a biennial plant, too well known to need description, and constituting one of the most valuable classes of vegetables. The *Brassica oleracea*, the original species from which the numerous varieties of cultivated cabbages are derived, although in a wild state very remote in appearance from the full, round head which our plants present, is scarcely more so than the kale, cauliflower, broccoli, etc., all of which belong to the same family. The principal

varieties are known to have existed at least as far back as the 16th century, but minor varieties are being constantly produced by selection and intercrossing. The parent stock is of highly vegetable character, as its habitat and habit alike show; and placed in more favorable conditions its growth becomes luxuriant. More normally it is carried back into the stem, and this may accordingly become swollen and turnip-like, in which case we have the kohlrabi, of which an extreme subterranean and almost turnip-like variety has also arisen, or may be, as in the Jersey cabbage, largely applied to the purpose of the growth of the stem, which may reach a height of 8 to 10 feet, and furnish not only walking-sticks, but even spars for small thatched roofs, etc. The vegetative overplus may, however, also be applied to the formation of buds, which accordingly develop with peculiar exuberance, giving us Brussels sprouts. The most evolved and final variety is the cauliflower, in which the vegetative surplus becomes poured into the flowering head, of which the flowering is more or less checked; the inflorescence becoming a dense corymb instead of an open panicle, and the majority of the flowers aborting, so as to become incapable of producing seed. Let a specially vegetative cabbage repeat the excessive development of its leaf parenchyma, and we have the wrinkled and blistered savoy. Again a specially vegetative cauliflower gives us an easily grown and hardy winter variety, broccoli, from which, and not from the ordinary cauliflower, a sprouting variety arises in turn.

The common cabbage is by far the most valuable to both man and beast. It is also the most productive; for it is believed that an acre of ground will yield a greater weight of green vegetable matter (and thus be more profitable to the farmer) in the shape of cabbage than in that of any other vegetable whatever. It is very abundantly produced by clay soils which are unfit for turnips, and the farmers who cultivate such soils will find it a vegetable worthy of much attention. The cabbage furnishes green fodder for cows and sheep, which is at least as good as turnips or carrots, fattening the animals equally fast, and rendering their milk, butter, etc., to the full as sweet; and is so far preferable, as it keeps later in the spring, and thus supplies green food when no other can be procured. It is eaten by men in three forms, all of which have their admirers, but which vary much in respect to their wholesomeness and digestibility. These forms are sliced raw, plain-boiled, and salted cabbage or sauerkraut (q.v.), the favorite dish of the German nation. Raw cabbage, sliced fine and eaten with vinegar, either cold, or hot enough merely to wilt the vegetable, is one of the lightest and most wholesome articles of vegetable food, and in this shape will supply a green summer vegetable through the whole of the winter. Its use cannot be too highly recommended. Boiled cabbage takes longer to digest and is more trying to a weak stomach.

Cultivation.—The cabbage being biennial, the main crop must be sown the autumn previous to that in which it is to be reaped. Field cabbages and the drum-head varieties that are used in gardens, being late in character, may be sown in July, or from the third week of that month to the second week of August. But

CABBAGE-BARK — CABEIRI

the smaller and early sorts used in gardens should not be sown before the first week of August, nor later than the second week of that month. If the plants are reared earlier, they are apt to run to seed the following spring; and if, on the other hand, they are reared later, they will not acquire strength enough to withstand the cold of winter before it comes upon them. For successive crops to be used in the shape of young summer cabbages, one or two sowings may be made from the beginning of March to the beginning of April. Autumn-sown plants may be planted out in rows permanently as soon as they are strong enough. Additional plantations from the same sowing may be made in spring, to be followed by others, made at intervals, up till July, from spring-sown plants. Thus a close succession of usable cabbage may be obtained the year round. In the northern parts of the United States cabbages for the early summer market are sown about September, kept under glass or frames during winter, and planted out in spring. For later markets the seed is sown in beds as early as possible in spring (about March), and transplanted later. Cabbages are sometimes preserved for winter by inverting them and burying them in the ground. Cabbage coleworts may be obtained from any good early variety of cabbage. They are simply cabbages which are not permitted to form hearts, but are used while the leaves are yet green and the hearts more or less open. Three sowings should be made for the rearing of these: the first about the middle of June, the second about the same time in July, and the third about the last week of the latter month, or the first week of August. These sowings will provide crops of green cabbages from October till March or April, if the winter is not destructive, after which they begin to run to seed.

• **Cabbage-bark.** See **ANDIRA**.

Cabbage-beetle. See **CABBAGE-INSECTS**.

Cabbage-butterfly, a name given to several species of butterfly, hence called *Brassicaria*, which deposit their eggs on cabbage-leaves; for example, *Pontia*, or *Pieris brassica*. See **BUTTERFLY**.

Cabbage-fly, a species of insect (*Anthomyia brassica*) of the same order (*Diptera*) as the house-fly, the larvæ of which prey upon the roots of cabbages. The *Anthomyia* deposit their eggs in the earth, and the different species receive different names according to the particular roots upon which the larvæ feed. Thus we have the potato-fly, the turnip-fly, etc.

Cabbage-insects, certain insects injurious to the cabbage, some of which also prey on the radish. The harlequin cabbage-beetle (*Murgantia histrionica*) destroys in the southern States, by its punctures, cabbages, turnips, radishes, mustard, etc. It is a black-and-orange-colored bug. The newly hatched insect is pale green marked with black, but with successive molts takes on certain orange markings. The eggs hatch on the third or fourth day after laying, and the young bugs go through all their molts and are ready for reproduction in about two weeks. There are many generations in the course of the summer; and on the advent of winter the adult insects crawl under rubbish to hibernates. The earliest specimens in the spring

congregate upon mustard and early radishes, flying later to cabbages. The very young, as well as the old, combine to destroy the plant, which wilts as if poisoned. The insect is very difficult to kill, so that destruction of the over-wintering individual is the important point to be striven for. Diluted kerosene emulsion must be applied, not too strong to ruin cabbages. The caterpillar of the cabbage-moth (*Noctua brassica*) preys on cabbage and turnip leaves. Cabbages are more or less injured by the web-moth (*Plutella xylostella*), the zebra caterpillar (*Mamestra picta*), the cabbage aphid, the cabbage-weevil (*Otiorynchus picipes*), etc. All these can best be destroyed by the use of pyrethrum, or dilute kerosene emulsion.

Cabbage-moth. See **CABBAGE-INSECTS**.

Cabbage-palm, a name given to various species of palm-tree, from the circumstance that the terminal bud, which is of great size, is edible and resembles cabbage, as the *Arcea oleracea*, a native of the West Indies, the simple unbranched stem of which grows to a height of 150 or even 200 feet. It is crowned by a head of large pinnated leaves. The flowers are placed on a branching spadix and protected by a double spathe. The unopened bud of young leaves is much prized as a vegetable, but the removal of it completely destroys the tree, as it is unable to produce lateral buds. *Ptychosperma* (*Seaforthia*) *elegans* is the cabbage-palm of New South Wales. The name is also given to the *Euterpe montana* and the *Chamærops palmetto*.

Cabbage-rose, a species of rose (*Rosa centifolia*) of many varieties, supposed to have been cultivated from ancient times, and eminently fitted, from its fragrance, for the manufacture of rose-water and attar. It has a large, rounded, and compact flower. It is called also Provence (or more correctly Provins) rose, from a town in the French department of Seine-et-Marne, where it is much cultivated.

Cabbage-tree, a name given to the cabbage-palm, and also to a tree of the genus *Andira* (q.v.).

Cab'bala. See **CABALA**.

Cabeiri, kâ-bî'ri, or **Cabiri**, heroes or divinities, venerated by the ancients in Samothrace, Lemnos, and in different parts of the coasts of Greece, Phœnicia, and Asia Minor, as the authors of religion and the founders of the human race. The multiplicity of names applied to the same character, the interchange of the names of the divinities themselves with those of their priests, the oracular law which enjoined the preservation of ancient barbaric names, and thus led to a double nomenclature, sacred and profane, together with the profound secrecy of the rites, have involved the subject in great obscurity. Some have thought that the Eastern mythology and the Druidism of western Europe contain traces of the Cabeiri. Some say there were six, three male and three female, children of Vulcan and Cabira, daughter of Proteus. Others make two, sons of Jupiter or Bacchus. In Samothrace four were venerated. The mysteries celebrated there, in the obscurity of night, were the most famous.

CABELL — CABINDA

Ca'bell, James Lawrence, American sanitarian: b. Nelson County, Va., 26 Aug. 1813; d. Overton, Va., 13 Aug. 1889. He was graduated at the University of Virginia in 1833, where he later filled the chair of anatomy. During the Civil War he had charge of military hospitals for the Confederate government. He devised measures to check the yellow fever epidemic at Memphis and was president of the National Board of Health from 1879 till his death.

Cabell, William, American statesman: b. Licking Hole, Va., 13 March 1730; d. Union Hill, Va., 23 March 1798. He was a member of the House of Burgesses of Virginia upon the outbreak of the Revolution; took an active part in the affairs of the new nation, and before the adoption of the Federal Constitution was presiding magistrate for the United States in Virginia.

Cabell, William Lewis, American soldier and lawyer: b. Danville, Va., 1 Jan. 1827. He graduated at West Point 1850, and served in the 7th Infantry 1858. In 1858 he was attached to Gen. Harney's staff in the Utah expedition. Between 1859-69 he was chiefly engaged in constructing forts in the country occupied by the Comanches, Kiowas, and other savage tribes. Resigning in 1861 he entered the Confederate service and rose to the rank of brigadier-general. While on a raid into Kansas in 1864 he was captured and held prisoner of war until 28 April 1865. Since 1872 he has practised law at Dallas, Texas, being four times mayor of the city. He was a United States marshal, 1885-9.

Cabello. See PORTO CABELLO.

Ca'ber, the undressed stem of a tree, 20 or more feet long, used for trial of strength in Scottish athletic games. It is held upright against the chest, by the smaller end, and tossed so as to strike the ground with the heavier end and turn over. The contestant making the farthest toss with the straightest fall is winner.

Cabes, ka'bēs, or **Gabes**, Africa, a town and port of the French protectorate of Tunis. It stands at the foot of the Jebel Hamarra, on the right bank of the Wad-er-rif, near the head of the Gulf of Cabes, and may be said to consist of several villages. It has some export trade in dates, henna, etc. The Gulf of Cabes (Syrtis Minor) has at its entrance the islands of Kerkenna and Jerba. Its chief seaport is Sfax. Pop. of Cabes, 13,000.

Cabet, Etienne, ā-tē-ēn kā-bā, French communist: b. Dijon, 2 Jan. 1788; d. St. Louis, Mo., 9 Nov. 1856. He was brought up for the bar, and was appointed attorney-general of Corsica, from which office, however, he was soon dismissed. He was sent to the chamber of deputies in July 1831, and there made himself so obnoxious to the government by his violent speeches, and at the same time by his inflammatory pamphlets and a journal entitled 'La Populaire,' that he was indicted for treason, and rather than subject himself to the imprisonment to which he was sentenced, withdrew for five years to England. While there he published the 'Voyages en Icarie,' in which he elaborated his scheme of communism, which from 1842 to 1848 passed through five editions. On 2 Feb. 1848, a band of Icarians left France

for the Red River in Texas, where Cabet had secured a tract of 400,000 acres of land, the free use of which was open to the settlers, under condition that before their departure they should deposit all their funds in the hands of Cabet, who assumed the financial and general control of the expedition. But the expedition turned out badly, and lawsuits were instituted against Cabet; and on 30 Sept. 1849, after he had left France for Texas, he was found guilty by default of swindling his disciples, and sentenced to two years' imprisonment. Meanwhile, with his colony of Icarians much reduced in number, he took up his abode at Nauvoo, on the Mississippi, in May 1850, and soon after returned to Paris. There, after a protracted trial, his innocence was fully established, 26 July 1851, by the court of appeal, and the judgment against him cancelled. He returned to Nauvoo, where he continued to preside over his colony; but many disappointments and cares embittered his life and accelerated his death. In justice to Cabet it should be said that the highest moral tone prevailed in Nauvoo, and whatever may be the politico-economical objections to his system, the colony presented, as far as the conduct of the settlers was concerned, a model of purity and industry.

Cabeza de Vaca, Alvar Nuñez, āl'bār noon'yēth kā-bā'thā dā bā'ka, Spanish explorer: b. 1507 (?); d. about 1564. He was second in command in the ill-fated expedition of Pánfilo de Narváez to Florida in 1528. After the loss of their commander, Cabeza de Vaca, with a few survivors, landed west of the mouth of the Mississippi, and after eight years of wandering and captivity among the Indians, reached a Spanish colony on the Pacific. He returned to Spain, and in 1540 was appointed Governor of La Plata. He explored Paraguay, but became unpopular with the colonists, and after a defeat by the Indians was arrested on the charge of one of his subordinates, returned to Spain (1544), found guilty, and banished to Africa. Eight years later he was pardoned and made judge of the Supreme Court at Seville. He has left an account of his travels and explorations in 'Shipwrecks of Alvar Nuñez' and 'Commentaries.'

Cabezon, a name applied to three or four distinct fishes.

1. *Larimus breviceps*, occurring in seas from the West Indies to Brazil, and belonging to the family of croakers, or *Scianida*. It reaches a length of 10 inches.

2. *Scorpanichthys marmoratus*, a member of the *Cottida*, or sculpins. It is found from Puget Sound to San Diego, reaches a length of 30 inches, and is a common food-fish, but its flesh is coarse and tough.

3. The smooth cabezon (*Leptocottus armatus*), also a sculpin of the Pacific coast.

4. *Porichthys notatus*, a member of the *Batrachoidida*, found from Puget Sound to Lower California, which reaches a length of 15 inches and is sometimes called "singing-fish."

Cabillonum. See CHÂLON-SUR-SAÔNE.

Cabinda, ka-bēn'da, or **Kabinda**, Africa, Portuguese seaport and territory, north of the mouth of the Congo. The territory is bounded by the Atlantic on the west, the Congo Free State on the south, and French Congo on the

CABINET

north. The inhabitants are governed by numerous petty chiefs. The town, situated about 40 miles north of the Congo estuary, carries on a considerable trade and has shown marked growth since the introduction of a high tariff in the Congo State. Its people are noted for their ship-building and other handicrafts. Pop. 10,000.

Cabinet, a collective name popularly given to the leading officers of state in a number of constitutional governments, acting as a body of advisers to the head of the state, and in some as the chief executive council and controller of legislation as well. The uniform name, however, implies a uniformity of nature which does not exist. The status and functions of different cabinets are widely divergent. The earliest one, that of England, is of a type exactly opposite to the next oldest, that of the United States; and all others are based on one of these two forms. Those of other constitutional monarchies in Europe, that of Japan, and that of the republic of France, are of the English type; those of Switzerland and the Latin-American republics are of ours. The English cabinet is to all intents and purposes a committee of the legislative body, in which its members have seats, before which they expound and defend the legislative measures they prepare, and to which they are directly responsible. They confine business mainly to measures of their own drafting, dictate its order, and carry on all the executive work of the State besides; they are, in fact, "the government," in current phrase. They act as a body, each minister supporting the proposals agreed on by the majority, or else retiring, and all resigning in a body if their proposals are voted down. They have even gained the immense power of being able to dissolve their own head body, the Parliament, and ordering a new election to test the sense of the people; a result due to their being the agents of the new sovereign, the Parliament, as they were of the older one, the monarch. When the power of proroguing Parliament was taken from the monarch, it was naturally given, not to Parliament itself, but to its deputies. This system was called by Walter Bagehot "Cabinet Government" specifically, as opposed to presidential government of fixed tenure; and his classification has been universally accepted. The American group is not, properly speaking, a cabinet at all, in the sense of a unified body. It does not act as a unit, and has no responsibility as a unit. Cabinet here is merely a popular name for the group of heads of the chief departments, whom the President consults by individuals or collectively at will, or not at all. Their functions are advisory only, and the President is under no obligation to take their advice; they are responsible only to him, and can be dismissed by him at any time. They have nothing to do with legislation, and by law are prohibited from being members of the legislative body. Obviously, their position resembles much more that of the advisers of an autocrat than of an all-powerful entity like the English government; but the former are never styled a Cabinet. The resemblances of the types are mainly confined to two: the ministers who form the Cabinet are selected by the actual head of the state, whose assistants they are to be, whether he is prime minister or president; and

they are all of one political party. Even here, however, the difference between the systems is strongly marked. The premier in a "Cabinet government" has very little liberty of selection. His ministers must be able debaters first and able men of affairs next, and successful politicians besides. If they cannot defend their policy effectively on the floor in Parliament, the government may be turned out; and practical incapacity may render all defense of no avail. But men of such varied powers and success are never very plentiful, and the premier can do little more than allot offices among a small group whom he finds to his hand. On the contrary, the United States Cabinet official need not speak in public, and even if he is a practical failure the President can dismiss him or allow him to resign without affecting his own tenure of office. The President, therefore, may fill such a post with a totally unknown man, in reliance on his unproved ability, without serious risk, and some such appointments have been eminently successful. As to party, the premier's action is equally compulsory, since his majority would vote down a party opponent's measure at once; while the President, having no legislation to carry through, and secure his place, can exercise a somewhat wider independence, though personal feeling and party urgency usually keep the selections within the limits.

The British cabinet, a shortened name for "cabinet council"—that is, a council held in the king's cabinet, or private room—gained its name under Charles I., about 1630-40, when it was merely a committee of the privy council to expedite business; and all through that and the next century it was steadily drawing power to itself. But the kings did not give up their control over the power of appointing the great officers of state without a long and bitter struggle; and it was not till George III.'s insanity loosened his hand that it can be said to have won the final victory. Even then, and during the early 19th century, its unity had by no means become so rigid as now; during the latter there were many instances of members of the cabinet opposing the measures of the majority, and even of the premier, and still retaining their places in it. But by the thirties it had pretty much settled into its present constitution and rules. An important change was made in 1782, just after the American Revolution, when its honorary members were dropped, and the membership confined to "efficient" members,—officers of state so important that they cannot be excluded from it, or personalities so powerful that vanished offices are kept constructively alive to make place for them. There is no absolute limit to the number of members, but custom dictates not less than 11, and the necessity of coming to some agreement and transacting business prohibits its being much in excess of 15. The premier assigns the offices, and almost invariably takes for himself the control of finances or foreign relations—that is, first lord of the treasury or secretary of state for foreign affairs. There are also the four other chief secretaries of state—for war, for home affairs, for the colonies, and for India; the chancellor of the exchequer, the first lord of the admiralty, the lord privy seal, the lord president of the privy council, and the lord chancellor; the chief secretary for Ireland, the

CABINET ORGAN — CABLE

postmaster-general, the president of the board of trade, and the chancellor of the Duchy of Lancaster (one of the defunct posts used to give an able man a place in the cabinet). Other officers can be called in if desired. The prime minister presides, but has no added authority; if he is a strong man, however, no member would remain in the cabinet if steadily opposed to his general policy. All the cabinet's deliberations are secret; no minutes are taken, and it would be a gross breach of faith to reveal the struggles of opinion within it which result in an agreement on a line of policy.

The American Cabinet, or "President's Cabinet," has, of course, grown with the growth of the departments. There were but four Cabinet officers at the outset, the secretaries of state, of war, and of the treasury, with the attorney-general. Of these, following the English tradition, in which from necessity, foreign affairs had held the highest place, the secretaryship of state was regarded as the most important and honorable, and its incumbent was considered to be in the line of succession for the presidency, as for several administrations proved to be the case. John Quincy Adams was the last of these, and he appointed his chief rival, Henry Clay, secretary of state with the presidential succession in view. The same notion has lingered to our own day, and caused the secretary of state to be termed the "premier" of an administration; in itself an absurd and meaningless term, but with color given to it by the preference for this post among some of the ablest party leaders ambitious of the presidency. The next officer added was the secretary of the navy, whose office was created in 1798. In 1829 the postmaster-general was raised to the Cabinet, though the office had existed 35 years, in 1849 the secretaryship of the interior was created and made of Cabinet rank; in 1889 was added the secretary of agriculture, and in 1903 the secretary of commerce and labor. In accordance with Congressional action in 1886 the Cabinet officers rank in order of succession to the presidency, as follows: Secretary of state, secretary of war, secretary of the treasury, attorney-general, postmaster-general, secretary of the navy, secretary of the interior, secretary of agriculture, and secretary of commerce and labor. It will be noted that after the original four the others are named in order of the creation of their departments, not of their elevation to Cabinet rank.

The term "cabinet" is sometimes used of the heads of our State departments advisory to the governor; but this is even less defensible than our national term, as the officers are elected by the people on the same ticket with the governor, and he has no power of appointment or dismissal. The municipal officers accessory to a mayor are sometimes so called; which occasionally has justification in the fact that some of them are appointed by him.

Cabinet Organ, a small portable reed organ or harmonium, designed for domestic use or for very small churches or schools.

Cabi'ri. See **CABETRI**.

Cable, George Washington, American novelist and miscellaneous writer: b. New Orleans, La., 12 Oct. 1844. His father died when

he was 14 years of age, and he had to leave school and seek employment as a clerk in order to support his mother and sisters. In 1863 he joined the Confederate army as soldier in a cavalry regiment, and served till the conclusion of the Civil War, when he returned to New Orleans and again took to commercial life. But in 1879, being by this time a practised writer, and having had considerable success with his literary ventures, he decided to devote himself entirely to authorship. In 1884 he took up his residence in Massachusetts, where he has originated a system of "home culture clubs." His first important book, 'Old Creole Days' (1879), appeared originally in 'Scribner's Magazine'; and since its publication he has written 'The Grandissimes' (1880); 'Madame Delphine' (1881); 'The Creoles of Louisiana' (1884), a history; 'Dr. Sevier' (1884); 'The Silent South' (1885), a plea for the negro; 'Bonaventure' (1888); 'The Negro Question' (1888); 'Strange True Stories of Louisiana' (1889); 'John March' (1894); 'Strong Hearts'; 'The Cavalier' (1901); 'Bylow Hill' (1902). For most readers the chief interest of Mr. Cable's novels lies in their excellent descriptions of Creole life, a subject which he may be said to have introduced into literature. His pictures of negro life are equally effective, and he handles dialect in a masterly manner.

Cable, Ransom R., American railroad manager: b. Athens, Ohio, 1834. He had almost no educational advantages, and early in life removed to Rock Island, Ill., where he was at first in the coal, flour, and lumber business, but later came to be wholly identified with Illinois railroads, and particularly the Chicago, R. I. & P. Ry. He was elected a director in 1877, and was successively vice-president, general manager, and in 1898, chairman of the board of directors.

Cable, a large rope or iron chain. The term cable is most frequently used in its nautical sense to describe the means by which a ship is connected with her anchor. The large ropes used for towing, or for making a vessel fast to a buoy or pier, are commonly known as hawsers. The term cable is also applied to the large suspensory ropes (usually of twisted or parallel wire) from which suspension bridges are hung, and to the endless ropes used to operate the kind of street cars commonly called cable cars or grip cars. Rope cables are made of hemp, manila, or other fibre, or of wire, twisted into a line of great compactness and strength. The circumference of hemp rope varies from about 3 to 26 inches. A certain number of yarns are laid up left-handed to form a strand; three strands laid up right-handed make a hawser; and three hawsers laid up left-handed make a cable. The strength of a hemp cable of 18 inches circumference is about 60 tons, and for other dimensions the strength is taken to vary according to the cube of the diameter. Wire rope has within recent years largely taken the place of hemp for tow-lines and hawsers on board ship. These usually consist of six strands, laid or spun around a hempen core, each strand consisting of six wires laid the contrary way around a smaller hempen core. The wires are galvanized or coated with a preservative composition. Wire ropes are usually housed on board ship

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by winding them round a special reel or drum. Hemp cables, moreover, have for long been almost wholly superseded by chain cables; the introduction of steam on board ship having brought in its train the powerful steam windlass wherewith to manipulate the heaviest chains and anchors required.

Chain cables are made in links, the length of each being generally about 6 diameters of the iron of which it is made, and the breadth about $3\frac{1}{2}$ diameters. There are two distinct kinds of chain cables—the stud-like chain, which has a tie or stud welded from side to side, and the short-link or unstudded chain. The cables for use in the mercantile service are made in 15-fathom lengths, but in government contracts chain cables are required to be made in $12\frac{1}{2}$ -fathom lengths, with one swivel in the middle of every alternate length, and one joining-shackle in each length. Besides the ordinary links and joining-shackles, there are end-links, splicing-tails, mooring-swivels, and bending-swivels. The sizes of chain cables are denoted by the thickness of rod iron selected for the links. The following table gives certain ascertained quantities concerning the cables in ordinary use:

Thickness of Iron	Weight of Stay-pin	Weight per Fathom	Breaking Strain
$\frac{1}{2}$ in.	$\frac{1}{2}$ oz.	13½ lbs	6 tons
1 " "	$3\frac{1}{2}$ " "	54 " "	24 " "
$1\frac{1}{2}$ " "	12 " "	121 " "	60 " "
2 " "	28 " "	215 " "	99 " "
$2\frac{1}{4}$ " "	40 " "	272 " "	120 " "

Compared with the strength of hempen cable, a chain cable of one inch diameter of rod is equivalent to a hemp cable $10\frac{1}{2}$ inches in circumference; $1\frac{1}{4}$ inches, to $13\frac{1}{2}$ inches; $1\frac{1}{2}$ inches, to 16 inches; $1\frac{3}{4}$ inches, to 18 inches; and 2 inches, to 24 inches. In navigation a cable's length is a nautical measure of distance equaling 120 fathoms, or 720 feet, by which the distances of ships in a fleet are frequently estimated. This term is often misunderstood. In all marine charts a cable is deemed 607.56 feet, or one tenth of a sea mile. In rope-making the cable varies from 100 to 115 fathoms; cablet, 120 fathoms; hawser-laid, 130 fathoms, as determined by the British admiralty in 1830. According to Ure a cable's length is 100 to 140 fathoms in the merchant service. The wire rope used for submarine telegraphy is also called a cable. See CABLES, SUBMARINE.

Cables, Submarine, specially constructed ropes of wire, hemp, and gutta-percha, or other water-proofing and protecting materials, laid on ocean or river beds for the purpose of providing means of electrical communication across large bodies of water.

Until the discovery of gutta-percha such communication was impossible, as water is so good a conductor of electricity that the submersion of current-carrying wires was dependent upon complete insulation. In this gum, however, such a perfect insulator was found that submarine communication all over the world became merely a question of time, experience, and necessity. In 1843 Prof. S. F. B. Morse suggested electrical communication between the United States and Great Britain, but it was not until more than 20 years had passed

that practical telegraphy across the Atlantic Ocean was established.

Early Cables.—The first under-water cables were short ones laid across rivers; later the English Channel was electrically "bridged" in this manner. In 1852 Dover and Ostend were connected by a cable 75 miles long and containing six wires. In 1854 Sweden and Denmark, Italy and Corsica, and Corsica and Sardinia were linked. In the same year the New York, Newfoundland, and London Telegraph Company was incorporated, mainly through the efforts of Cyrus W. Field and Peter Cooper, of New York, for the purpose of laying a cable between Newfoundland and Ireland, a distance of about 2,000 miles. It received a charter from the Newfoundland legislature, with an exclusive right for 50 years to establish a telegraph between the American continent and Europe via Newfoundland. In 1856 Cape Ray and Cape Breton were united, as well as Prince Edward's Island and New Brunswick. The same year Mr. Field organized the Atlantic Telegraph Company. It was supported by both the United States and British governments, but the results of its efforts were discouraging for several years. In August 1857 an attempt was made to lay a cable by the American frigate Niagara and the British ship-of-war Agamemnon, but about 300 miles from the Irish coast the cable parted, owing to a strain caused by a sudden dip of the seabottom. In 1858 the same two ships, each with half the cable on board, steamed to a point in the Atlantic midway between Valentia, Ireland, and Heart's Content, Trinity Bay, Newfoundland, spliced the cable, and, steering in opposite directions, safely landed the ends at their destinations on 5 August. The cable was 2,500 miles in length, weighed about one ton per mile, and cost \$1,250,250. It was composed of seven copper wires encased in gutta-percha, which in turn was surrounded by a covering of hemp saturated with oil, pitch, and beeswax; the whole being protected by an outer sheath composed of 18 strands of seven iron wires each. Despite the success in laying, however, the cable was practically useless. The current was so weak that a message of 90 words from Queen Victoria to President Buchanan took 67 minutes to transmit, and after a few more messages the cable ceased to transmit signals. Two more cables were laid in this year to connect Great Britain with the Continent,—one to Holland and the other to Hanover; and 1859 saw, among other cable connections, the joining of England with Denmark and France, and of Malta with Sicily. In 1860 a cable was laid between France and Algiers, and in 1861 Malta was connected with Alexandria, and Batavia with Singapore. Failures were met with in attempts to lay cables through the Red Sea and from Falmouth to Gibraltar, and these, with the ill-success of the Atlantic cable, caused great disappointment to the promoters of the latter enterprise. Capital seemed to have made up its mind that a successful cable across the Atlantic was impossible. In 1865, however, another cable of 2,300 miles, and weighing 4,000 tons, was shipped on the Great Eastern, and was successfully paid out for 1,065 miles from Valentia, when it broke, and was abandoned after vain attempts to grapple the lost end. The following year the Great Eastern sailed with a lighter

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but stronger cable of 2,370 miles and laid it successfully. She then grappled the lost cable of the year before, recovering it from a depth of two miles, spliced it, and completed the task by landing the end at Heart's Content.

Advance in Cable-Laying.—With two cables now linking America and Great Britain, confidence was restored, and the manufacture and successful laying of submarine cables went on at a rapid rate. In 1869 a line was laid from Brest, France, to St. Pierre, Newfoundland (a distance of 3,100 miles), by a French company. In 1873 a cable joined the cities of Lisbon and Pernambuco, and in 1874 and 1875 two more cables were laid between Valentia and Heart's Content. The latter weighed less than 900 pounds per mile. Another line from Penzance, Cornwall, to St. Pierre, 2,920 miles, was laid in 1879, and one from England to Panama in 1882.

Meanwhile an incident had occurred which greatly influenced the expansion of submarine cable systems. In 1870 the British government purchased the entire land telegraph system of the British Isles, and the capital thus liberated, about \$50,000,000, was largely reinvested in submarine cable ventures. In 1872 a number of small competing companies with lines through the Mediterranean were consolidated into the Eastern Telegraph Company, and in the following year the Eastern Extension, Australasian, and China Telegraph Company was formed by the amalgamation of companies owning cables farther east. Since then the Eastern, Eastern Extension, and Associated Cable companies have become practically one immense organization.

In 1884 John W. Mackey and James Gordon Bennett organized a cable system across the Atlantic from Valentia to Torbay, N. S., in the interests of the Commercial Cable Company and the New York *Herald*. Consolidation of competing companies followed as a matter of course, and now there are practically, besides the French lines, but two competing cable companies in the north Atlantic field—the Anglo-American and the Commercial Cable companies. There are now 15 cables between North America and Europe, some of which run into New York harbor. The cables of 1858, 1865, and 1866 are "dead," and three others have but a brief tenure of life. Nine are "alive" and active.

Recently another great cable-laying boom has set in. France proposes to connect its colonies by a system under its own control. A German cable has been laid from Emden, Germany, to New York, via the Azores, which works in conjunction with the Commercial Cable Company. That company has recently laid its fourth cable connecting New York and London, via Canso, the Azores, and Waterville in Ireland.

Pacific Cables.—In the Pacific Ocean the Commercial Company has a gigantic undertaking in course of construction. This is no less than a cable 6,912 miles long, and costing \$12,000,000, to be laid from San Francisco, via Honolulu, the Midway Islands, and Guam, to Manila, in the Philippines, with an ultimate extension to Shanghai or Hong Kong. The first section, from San Francisco to Honolulu, 2,413 miles, was opened 1 Jan. 1903. This section is the most hazardous on the route, depres-

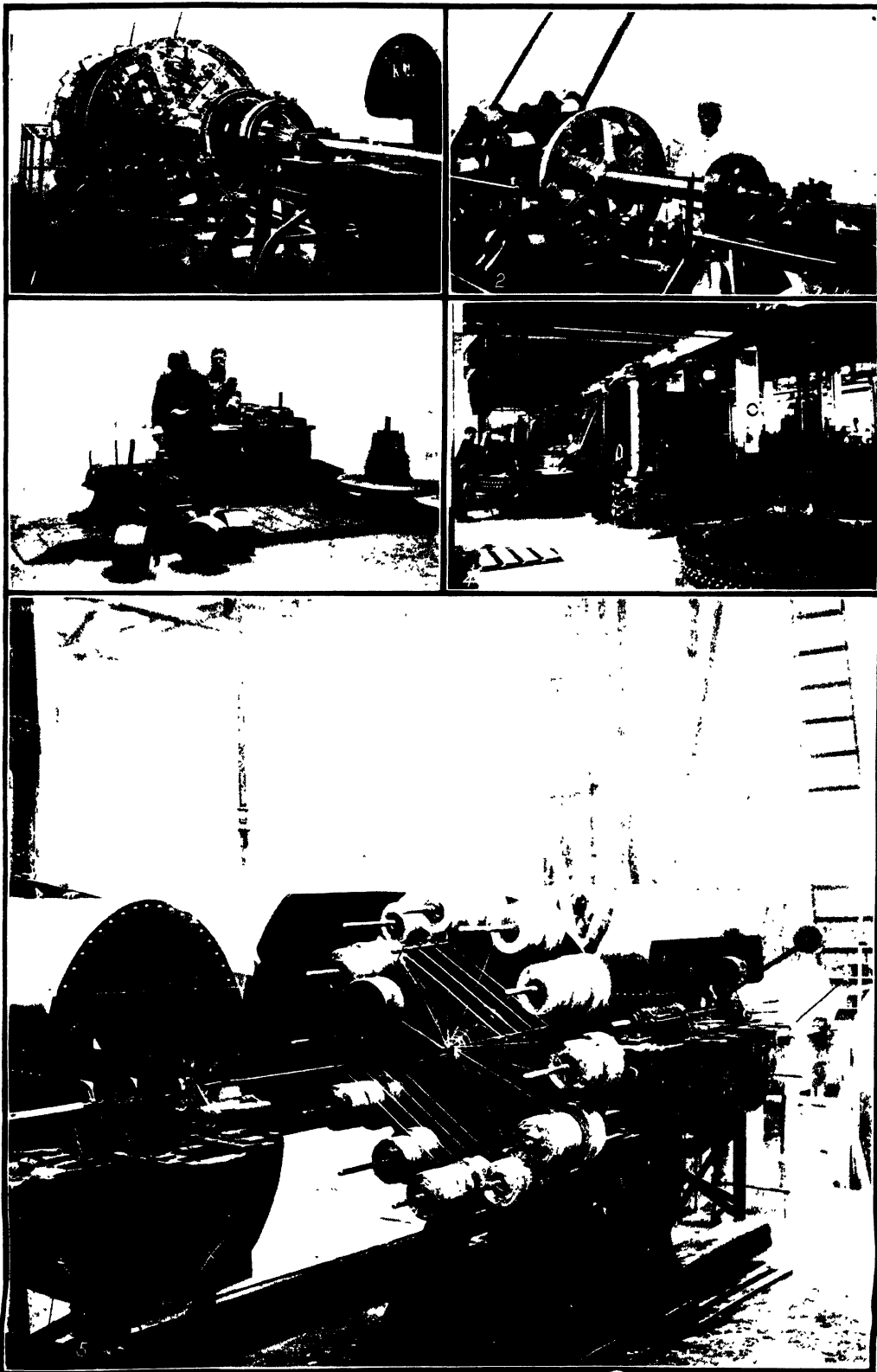
sions of 5,160 and 5,269 fathoms having been encountered, and the profile displaying mountains of immense elevation and valleys of corresponding depth. A level plain, with an average depth of 2,700 fathoms, extends throughout the second section, from Honolulu to the Midway Islands; the bottom being of soft mud and extremely favorable for cable-laying. Thence toward Guam an average of 3,200 fathoms is found, and favorable conditions are maintained throughout. The last section is similar in its profile to the first, though the depth averages less, being from 1,400 to 2,700 fathoms. The sea-bed is extremely irregular in outline, with many reefs and depressions.

The cable is built around a core formed of copper wire insulated by gutta-percha, around which layers of jute yarn are wound. This, in turn, is sheathed in small cables, each formed of several strands of steel wires. An outer covering of jute yarn, the whole saturated with a bituminous compound, binds together the conducting and protecting wires in one solid mass. The landing of the shore end of the cable at San Francisco was effected thus: A section of 6½ miles was cut from the main cable on board the cable-steamer Silvertown, and loaded on a tender, which steamed toward the shore. On approaching the line of breakers, which were heavy, the shore end was floated on balloon buoys placed every 10 fathoms, and a team of 12 horses dragged it ashore, where it was spliced to the permanent shore connection, and the tender returned to the Silvertown, on board which the shore section was respliced to the main cable. The cable-ship then started for Honolulu in the evening of 14 Dec. 1902.

The Silvertown was specially built for cable-laying purposes. On this trip she carried 2,413 nautical miles of cable, weighing 4,807 tons. She arrived off Honolulu on 25 December and landed the shore end by buoying the cable; but she employed no tender or horses. Two spider-sheaves were sent ashore, and fixed by sand anchors about 60 yards apart. A hauling-line was paid out from the ship, reeved through the sheaves, and brought on board again. One end of this line being attached to the cable, and the other to the picking-up gear, the engines were started and the cable was dragged toward the shore.

Another Pacific cable is being constructed jointly by the governments of Great Britain, Canada, and Australia across the Pacific from Vancouver to Fanning Island, Fiji Islands, Norfolk Island, and thence to New Zealand and Australia. It will be about 8,000 miles long, and the 3,600 mile stretch from Vancouver to Fanning Island will be the longest single section in the world. This new cable brings the Australasian colonies 10,000 miles nearer to Canada than they were before, and there is now completed a British telegraph girdle of the world which touches foreign territory only at Madeira and St. Vincent, in the Cape Verde Islands, both belonging to Britain's old ally, Portugal.

Mention has already been made of the consolidation of competing lines in the Mediterranean and the East into the Eastern Telegraph Company. To this huge organization belongs a marvelous network of submarine cables—practically all the cables from Land's End, in England, through the Mediterranean to Suez,



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THE MANUFACTURE OF SUBMARINE CABLES.

1 Armaturing Machine.

2 Stranding Machine.

3 Winding the Wire on the Bobbins.

4 Drying Apparatus.



CABLE STEAMER "ANGLIA" LAYING SHORE END OF THE NEW CAPE-OF-GOOD-HOPE CABLE AT ST. VINCENT,
Photographed by F. B. Foy.

CABLES

on through the Red Sea to Aden, across the Indian Ocean to Bombay, thence linking into the system Madras, Singapore, Hong Kong, Manila, Australia, and New Zealand. In addition, practically all the cables which now surround Africa, and many of those which cross the ocean and follow the coast-line of South America are in its control. To such an organization the laying of 15,000 miles of cable from England to Australia, via the Cape of Good Hope, at a cost of over \$15,000,000, was comparatively easy. Yet this great line may be traced from Land's End in England to Adelaide in South Australia, a distance which a modern Atlantic liner would take six weeks to steam over. The length of cable is more than half way round the globe, and about eight times longer than the first Atlantic cable.

Cable Statistics.—In all there are now about 200,000 miles of submarine cables, enough to go about eight times around the globe. They have cost about \$200,000,000, but their market value is considerably higher, as deep-sea cables are solid and profitable investments. Of the total mileage, the Eastern and its associated companies control practically half, or, to be precise, 99,262 nautical miles of cables, with 161 stations and 11 cable steamers. All told there are 42 cable steamers in the world, including those owned by the cable-construction companies and governments, with gross tonnage of about 65,000 tons. There are about 1,700 submarine cables ranging from a quarter of a mile to 15,000 miles. Nearly all the short lines belong to governments, but although only about 420 cables belong to private companies, these include at present all the deep-sea cables and about 90 per cent of the total length of cables in the world.

The life of a deep-sea cable, aside from injuries by ships' anchors, rocks, sharks, sawfish, and swordfish has been variously estimated at from 30 to 40 years. Sharks occasionally bite cables and leave some of their teeth embedded, and sawfish and swordfish attack them, especially in tropical waters, but on the level plains of ooze two miles or more below the surface cables seem to be almost imperishable. In shallow water they are more exposed to damage. Deep-sea cables generally weigh from one to one and a half tons per mile, but the portions lying in shallow water are so heavily armored as to weigh from 10 to 30 tons per mile. Yet last year the ocean cables of the Commercial Company were severed by ships' anchors five times. In the Firth of Forth in Scotland no less than 13 ship's anchors were once found entangled in a length of four miles of cable.

Cable Tariffs and Codes.—In the early days the Atlantic Telegraph Company started with a minimum tariff of \$100 for 20 words, and \$5 for each additional word. Later this was reduced to \$25 for ten words. It was not till 1872 that a rate of \$1 a word was introduced. This word-rate system proved so popular that it was soon adopted universally, and since 1888 the cable rate across the Atlantic has been down to 25 cents a word. Rates now range from the 25-cent tariff across the Atlantic to about \$5 a word between England and Peru. The average for the whole world is roughly \$1 a word. This the Commercial Company proposes to charge from America to the Philippines, as compared with the present rate of \$2.35 by the circuitous

route across the Atlantic, through the Mediterranean, the Red Sea, across the Indian Ocean, and on to Manila via Hong Kong. Even from New York to far-away New Zealand the rate is now only about \$1.50 per word. The cost of cabling, however, is greatly influenced by "coding," a system by which business men use secret words for commercial messages, and which has developed to an extraordinary degree of perfection. One code word will frequently stand for 10 or 15 words, and there are instances where one word has been used to represent over 100 words. Practically all commercial cablegrams are coded, and nearly all departments of commercial and industrial life nowadays have their special codes.

Speed of Transmission.—The cost of deep-sea cables makes it vitally important to get as much work out of them as possible. In the first place the transmission time of messages has been greatly reduced. Formerly from many parts of the world it took 5 or 10 hours to deliver a cablegram where it now takes from 30 to 60 minutes, and across the Atlantic the companies, for stock-exchange purposes at any rate, send a cablegram and get a reply in two or three minutes. In the second place, where traffic is heavy, speed of transmission of the signals has been greatly increased. Across the Atlantic and on three or four of the busy lines of the Eastern Company the art of cable telegraphy has been highly developed.

On the first Atlantic cables the speed was about seven words a minute in one direction only. The speed of recent Atlantic cables is as high as from 40 to 45 words a minute in both directions—that is, from 80 to 90 words a minute. Thus, compared with the early days, the speed and therefore the value of the best cables has been multiplied more than 10 times over by means of some of the most ingenious and delicate machinery in modern industry. On the first Atlantic cable it was found that, using land telegraph methods of signaling, the speed was only one or two words a minute. The first great forward step was to send exceedingly feeble currents and to use extremely sensitive receiving instruments. Lord Kelvin's mirror galvanometer supplied the instrument needed. By this means the speed of the early Atlantic cables was raised to seven or eight words a minute. Subsequently, when heavier cables were laid, the speed was increased to as much as 20 words a minute.

The Siphon Recorder.—In 1870 Lord Kelvin perfected his siphon recorder for working long cables, and it at once supplanted the mirror instrument, as it worked just as well with feeble currents, gave a written record of signals received, and enabled one man to do the work of two. An exceedingly light coil of fine wire (in shape and size like the long, narrow O which would be obtained by winding several hundred turns of fine silk thread around the palm of the open hand) is delicately suspended between the two poles of a powerful magnet. As the electric signals from the cable flow through the coil of wire, it swings round under the influence of the magnet, back or forward according as the current is positive or negative. The motions of the coil are transmitted by silken fibres to a little glass siphon about as thick as a needle and three or four inches long, suspended so as to swing with perfect freedom. One end

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of the siphon dips into a pot of ink, and the other end hangs close above a moving strip of paper. The signals are so feeble that if the end of the glass siphon rested on the paper it would not move at all, but by causing the siphon to vibrate continuously against the paper the free motion of the siphon is not interfered with, and the ink is spluttered upon the paper so that the siphon traces a line of very fine dots and thus records the signals transmitted through the cable. This instrument, though crude at first, has gradually been perfected. It is now the most important part of modern cable apparatus.

The Duplex System.—The next improvement, undoubtedly the greatest ever made for increasing speed, was the invention of a successful system of "duplexing" cables by Dr. Alexander Muirhead and Herbert Taylor in 1875. This invention rendered it possible simultaneously to send messages both ways through a long ocean cable. In 1878 the Direct United States cable across the Atlantic was successfully duplexed, and a speed of 16 words a minute obtained each way at the same time. Duplexing cables has now become such a fine art, chiefly through the labors of Dr. Muirhead, that the capacity of cables, and therefore their commercial value, has been practically doubled. Since 1875 about 80,000 miles of ocean cables have been duplexed almost entirely on the Muirhead system.

The increasing traffic across the Atlantic and the pressure of competition led next to an increase in the size of the copper "core" which conducts the electric signals. The resistance of a wire delays the electric current and therefore the speed. By doubling the size of the copper core the resistance is halved and the speed greatly increased. The copper wires used for telegraphy on land weigh about 200 pounds per mile. In 1894 two cables were laid across the Atlantic, one for the Commercial Cable Company and the other for the Anglo-American Company. The copper core of the former weighed 500 pounds per mile, while the latter weighed no less than 650 pounds per mile, or as much as three ordinary land wires. The result was that the speed obtained with these two cables was as high as 40 to 50 words a minute, or, working duplex, from 80 to 90 words a minute. On previous Atlantic cables 25 to 28 words a minute was the maximum each way. Owing to the reduction of rates the benefit of this tenfold increase of speed since the early days has gone almost entirely to the general public.

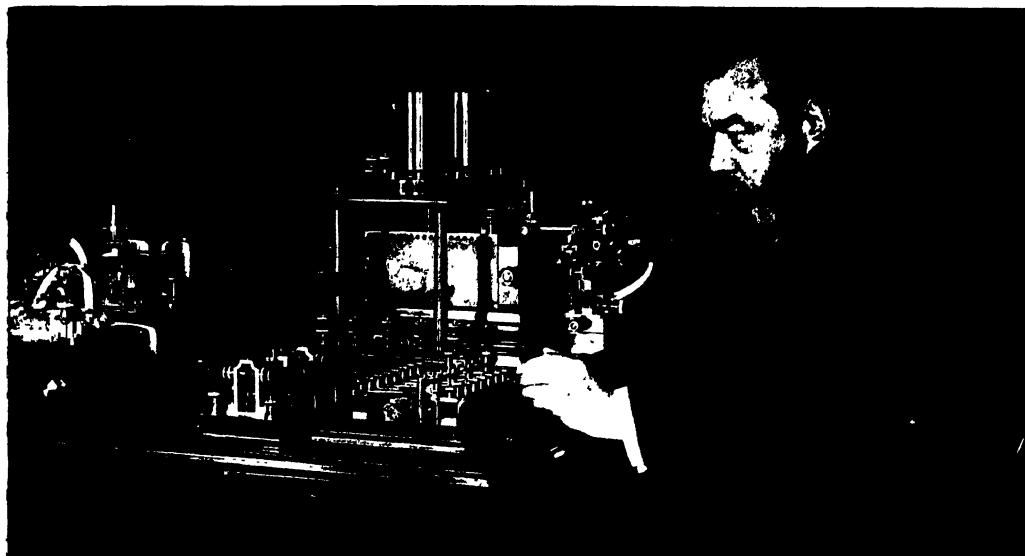
Automatic Transmission.—The increase in speed brought up another difficulty. No human operator can send so fast. The key used for signaling through cables by hand is practically the same as the ordinary Morse key used for land telegraphy, except that two keys are used side by side, one to send positive signals and the other negative signals, the letters of the alphabet being indicated by various arrangements of the two kinds of signals. First-class cable operators can send as many as 30 words a minute for a few minutes, but a sustained speed of 20 words a minute, when working by the hour, is regarded as very good. To take full advantage of the speed of a modern Atlantic cable therefore, it is necessary to have some automatic method of transmitting. The advantages of automatic transmission are higher speed, greater

uniformity of signals, more legibility, and fewer mistakes.

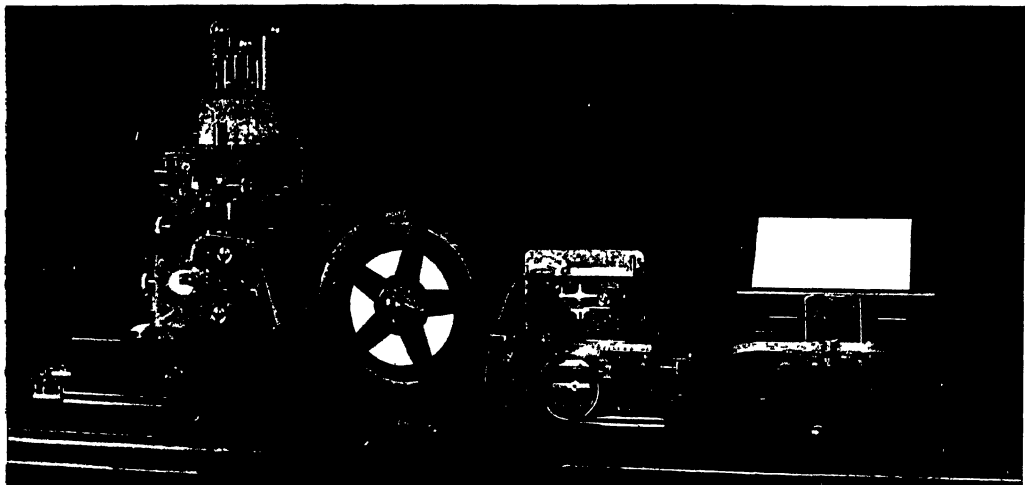
The method adopted is simple and beautiful, — a modification of the Wheatstone system. The message is first punched as a series of holes in a paper tape. This perforated tape is then run through an automatic transmitter, and by means of a system of small levers the required signals are transmitted at any desired speed. The operator has a wooden stick in each hand with which he strikes one or other of the three keys of the small perforator directly in front of him. One key punches a right-hand hole, another key a left-hand hole, and the middle key makes a space. In this way the cablegram before him is transmitted at the rate of about 20 words a minute into a perforated tape. From the perforator the tape runs into an automatic transmitter, or "auto." There is a row of small central holes in the tape, and on each side is a row of larger holes. The latter represent the message. A small star wheel in the "auto" engages with the central line of holes and feeds the tape along at a uniform rate. A couple of small steel rods about the size of a knitting-needle, one for each of the two rows of message holes, continually vibrate against the paper. When either of them enters a perforation in the paper, a lever connected with it moves and makes an electric contact, sending a short, sharp signal into the cable.

Cable Relays.—Recently several still more wonderful inventions have been perfected. There is good reason to believe that it is now possible to work a typewriter in New York by playing on a typewriter keyboard in London, and *vice versa*.

The little tape perforator in the first machine of the series has three keys. These have to be struck on the average four times for each letter, and much practice is required to become skilful in using it. Several tape-perforators with ordinary typewriter keyboards have been invented. The success of a machine of this kind will mean that cable messages will be transmitted by simply playing on a typewriter keyboard, the striking of the keys perforating the transmitting tape, which then runs through the "auto," which sends signals through the cable to the other end, where they are written in ink by the siphon recorder. It is at this latter point that has lain the great difficulty that has baffled cable inventors for years. By the time that an electric signal has passed through a long section, say 1,000 miles, of ocean cable, it has become so feeble that it can be recorded only by the extremely delicate mechanism of the siphon recorder. It has not been possible, until recently, to retransmit automatically into another section. On land, relays are used. For instance, messages from New York to Chicago are automatically repeated at Buffalo or Meadville, and by automatic repeating every 600 or 800 miles it is an every-day occurrence to telegraph direct between New York and San Francisco. A relay capable of performing similar work for cables has been a dream of cable engineers and inventors for years, and in default of such an instrument "human relays" have been employed; that is, at the end of one section of a cable an operator takes the paper record of a cablegram as it comes from the siphon recorder and retransmits it.

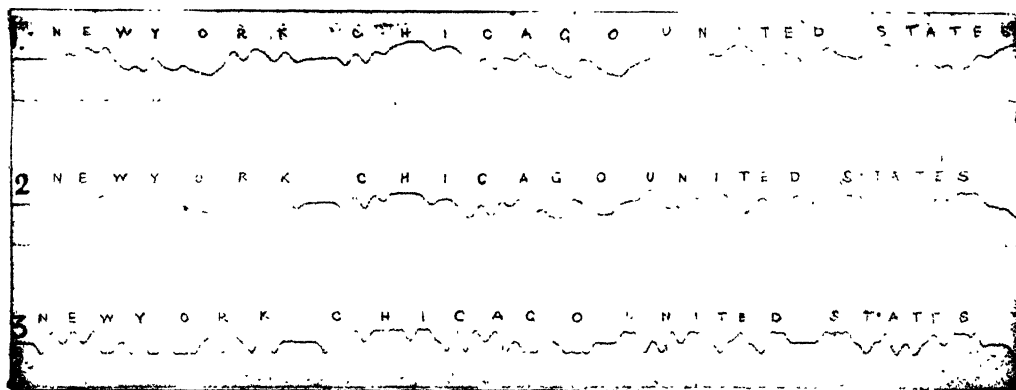


DR. ALEXANDER MUIRHEAD,
Inventor of the cable duplex, and his remarkable cable relay.



A GENERAL VIEW OF A SET OF MODERN CABLE INSTRUMENTS.

On right is tape perforator. In middle is automatic transmitter and on left is a siphon recorder for receiving the message at the other end of the line. One or two thousand miles of cable are supposed to intervene between this instrument and the transmitter



THREE SPECIMENS OF A SIPHON RECORD OF A MESSAGE AS RECEIVED OVER A LONG OCEAN CABLE.

The first is an old-time record. The second is a modern record like those of messages across the Atlantic. The third is the latest style of squarified record, received over the same cable. The remarkable increase in definiteness and uniformity is obvious. It is this latest achievement in cable signaling that has made cable relays possible.

CABOOL — CABOT

But the cable relay is now an accomplished fact. The only hope of constructing such an instrument was to utilize the siphon recorder. One difficulty has been that the movements of the siphon, as shown by the paper records, have till recently been most irregular. There has been what photographers would describe as "lack of definition" about the signals, rendering it hopeless to attempt to relay them automatically by machinery. The first thing to do was, therefore, to straighten and sharpen up the signals a bit, and a very able group of cable engineers, including H. A. C. Saunders, electrician-in-chief of the Eastern and its associate cable companies, his assistant, Walter Judd, with Dr. Muirhead, inventor of the cable duplex, and Messrs. Brown and Dearlove, succeeded in sharpening them. They secured very regular signals, usually described as "square signals." This result was obtained by means too technical to be described here, but the chief device used is known as an "inductive shunt." Having squared the signals, it was now possible, though by no means easy, to construct a cable relay. Two have recently been perfected. One is known as the Brown & Dearlove relay, the principal inventor of it being S. G. Brown. The other has been invented by Dr. Muirhead. In both a fine wire terminating in a platinum contact-point takes the place of the ink in the siphon of a recorder. The contact-point, instead of resting on the paper tape, rests on a rapidly moving metallic surface divided into two parts. In the Brown & Dearlove relay this contact-surface consists of a constantly revolving metallic drum or wheel. The siphon, with its wire and contact-point, "skates," as the inventor describes it, with the utmost freedom on the periphery of this wheel. The drum looks like a phonograph cylinder. As the siphon skates upon the right or left half of this drum it makes a positive or a negative electric contact and automatically transmits a corresponding signal with renewed energy into the next section of cable. In the Muirhead relay the moving metallic surface consists of a small plate vibrating rapidly. The result is the same. Able in this way to make definite electrical contacts through a long ocean cable, an operator can easily work, by means of these contacts, local apparatus moved by more powerful currents. In this way both Mr. Brown and Dr. Muirhead have devised perforators which reproduce at the receiving station perforated tape identical with that used for transmitting the message at the sending station. This tape is available for retransmission through an "auto," this plan having the advantage that the signals are retransmitted in as perfect form as the original signals; and, theoretically at any rate, the process may be repeated indefinitely, so that it would be possible to send a cable message automatically through a dozen stations from England to Australia. This will no doubt be done in time, but it is a very slow process getting such complicated and delicate inventions into commercial use. It is a question of time and growth. The Brown & Dearlove relay has been adopted by the Eastern Company, and has been in commercial use for some months at Mediterranean stations. Dr. Muirhead's relay has also proved very successful in several long-distance tests.

From this description of cable relays it will be seen that an operator, by playing on a typewriter keyboard in London, can now produce a perforated tape in New York. A machine invented by the writer of this article is so arranged that by simply turning a handle it works a typewriter automatically under the control of a perforated paper tape, something after the fashion of a mechanical piano, at a speed of 90 words a minute. In order that this machine may print messages from a perforated tape produced by the cable relays it is necessary that all the letters shall be of equal length, and the writer has devised a new cable alphabet that not only fulfills this condition, but is also about 12 per cent shorter than the cable alphabet at present in use.

Hence, it is now possible, at any rate theoretically, automatically to typewrite a cable message across the Atlantic in page form at a speed 12 per cent faster than the cables can at present be operated. More than this, by the same mechanism it is feasible to operate a linotype or typesetting machine automatically, so that the fantastic possibility presents itself of playing on a typewriter keyboard in London and setting type automatically in New York.

DONALD MURRAY.

Cabool. See KABUL.

Caboose, cā-boos', the cook-room or kitchen of a ship. In smaller vessels, the name is given not to a room but to an enclosed fireplace, hearth, or stove, for cooking on the main deck. The cook-room is also known as the "galley." The name caboose is also given to a railroad car on freight or construction trains, used for carrying brakemen, or workmen, tools, etc.

Cab'ot, George, American statesman: b. Salem, Mass., 3 Dec. 1751; d. Boston, 18 April 1823. He was educated at Harvard College. In 1791 he became United States senator for Massachusetts, and proved a steadfast friend of the Washington administration. He yielded essential aid to Hamilton in perfecting his financial system. In 1814 he was chosen a delegate to the memorable Hartford Convention, and was elected president of that assembly. See Lodge, 'Life and Letters of George Cabot' (1877).

Cabot, James Elliott, American biographer: b. Boston, Mass., 18 June 1821; d. 16 Jan. 1903. He was the friend and literary executor of Emerson and in 1887 published 'A Memoir of Ralph Waldo Emerson,' a work undertaken at the request of the Emerson family.

Cabot, John, or Giovanni Cabota (in the Venetian dialect, ZUAN CAROTA), an Italian navigator in English employ; the discoverer of the continent of North America. On 5 March 1496, he was given by Henry VII. of England letters patent authorizing him to take possession of any countries he might discover. Under this charter, in May 1497, he embarked in a single vessel, accompanied by his son Sebastian, and sailed west, as he said, 700 leagues, when, on 24 June 1497, he came upon land which he reported to have been a part of a continent, and which he assumed to be in the dominions of the Grand Cham. A letter of that year represents him as having sailed along the coast for 300 leagues; he landed, but saw no person, though he believed the country not uninhabited. He

planted on the soil the banners of England and of Venice. On his return he discerned two islands to the starboard, but for want of provisions, did not stop to examine them. He reached Bristol in August. His discovery attracted the favor of the English king, who on 3 Feb. 1498, granted him special authority to impress six English ships at no higher charges than were paid for ships taken for the king's service, to enlist companies of volunteers, "and theym convey and lede to the londe and ilees of late founde by the seid John." This license has been erroneously called a second charter; it was not so; the charter of 1496 was still valid and sufficient. This license is the last record that has been found of the career of John Cabot. He himself made no voyage under it, whether from illness or death, or other reason, can only be conjectured. Neither the time nor the place of his death, nor his age, is known. Neither is it known what country gave him birth. He was a Venetian only by denization. As he is found residing at Bristol the conjecture would arise that he was born an Englishman; but the license granted him in February 1498 calls him "Kabotto, Venician," a phrase which in our day, and still more in those days of stricter feudal rule, clearly implies that he was not a natural-born subject of the king of England. Had he been so, he would have been claimed as an Englishman. Consult: HARRISSE, 'Cabot, John, The Discoverer of North America, and Sebastian, His Son: a Chapter of the Maritime History of England under the Tudors (1496-1557)' (1895).

Cabot, Sebastian, English navigator: b. Bristol, about 1474; other authorities say 1477; d. London 1557. He was the son of John Cabot (q.v.). Sebastian was early instructed in the mathematical knowledge required by a seaman, and at the age of 17 had made several voyages. In 1496 John Cabot obtained from Henry VII. letters patent empowering him and his three sons, Lewis, Sebastian, and Sanctius, to discover unknown lands, and conquer and settle them. In consequence of this permission the king supplied one ship, and the merchants of London and Bristol a few smaller ones, and John and Sebastian sailed to the northwest. In June 1497 the coast of Newfoundland, or, as some think, of Labrador, was reached. The accounts of this voyage are attended with much obscurity; but a second patent was granted to John Cabot in 1498, and it seems that, in a subsequent voyage, the father and son sailed as far as Cape Florida, and were actually the first who saw the mainland of America. Little, however, is known of the proceedings of Sebastian Cabot for the ensuing 20 years; but it seems that, in the reign of Henry VIII., by the patronage of Sir Thomas Peart, vice-admiral of England, he procured another ship to make discoveries, and attempted a southern passage to the East Indies, in which he failed. This disappointment is supposed to have induced him to quit England and visit Spain, on the invitation of Ferdinand. The death of the king lost him his patron, and in a few years he returned to England, and was employed by Henry VIII. to find out the northwest passage. After this expedition he again entered the Spanish service, and in 1526 began a voyage which resulted in his reaching the river La Plata, where he discovered St. Salvador,

and erected a fort there. He returned to England toward the latter end of the reign of Henry VIII. At the beginning of the reign of Edward VI. he was introduced by the protector Somerset to the young king, who settled a pension on him as grand pilot of England. From this time he was consulted on all questions relating to trade and navigation; and in 1552, being governor of the company of merchant adventurers, he drew up instructions, and procured a license for an expedition to discover a passage to the East Indies by the north. He was also governor of the Russian company, and was very active in their affairs. He was the first who noticed the variations of the compass; and he published a large map of the world, as also a work under the title of 'Navigazione nelle parti Septentrionali, per Sebastiano Cabota' (1583). See NICHOLLS, 'Remarkable Life of Sebastian Cabot' (1869); WINSHIP, 'Cabot Bibliography' (1900).

Cabra, kă'bra, Spain a town in the province and 29 miles south-southeast of Cordova, in a valley almost environed by mountains. It has wide streets; a large irregular, but imposing looking square; two large and handsome parish churches; a richly endowed college, etc. Pop. (1902) 13,000.

Cabral, or **Cabrera**, **Pedro Alvarez**, pā'drô al'ba-rêth ka-bral', Portuguese navigator: b. about 1460; d. about 1526. In 1500 he received command of a fleet bound for the East Indies, and sailed from Lisbon, but having taken a course too far to the west he was carried by the South American current to the coast of Brazil, of which he took possession about 24 April 1500, in the name of Portugal. Continuing his voyage he lost several ships and men in a storm, but with the remainder he visited Mozambique, and at last reached India, where he made important commercial treaties with native princes, and then returned to Europe. Consult: FISKE, 'Discovery of America,' Vol. II. (1892); CAPISTRANO DE ABREU, 'Descobrimento do Brasil' (1883).

Cabrera Bobadilla Cerda y Mendoza, Luis Gerónimo Fernandez de, loo-ês hā-rôn'ê-mô fêr-nan'dêth dā ka-brā'ra bô-ba-dêl'ya thār'da ê mên-dô'tha, Spanish colonial governor: b. Madrid, about 1590; d. near there, 1647. He was viceroy of Peru 1629-39, during which period the useful properties of cinchona bark were discovered and the third ascent of the Amazon made. The cruelty of the Spaniards caused a revolt among the Urn Indians near Lake Titicaca, which Cabrera had great difficulty in suppressing.

Cabrera, Ramon, rā'mon ka-brā'ra, Carlist general: b. Tortosa, Catalonia, 31 Aug. 1810; d. Wentworth, England, 24 May 1877. He was brought up for the clerical profession, for which, however, he was unfitted by his love of pleasure and dissipation. When civil war broke out between the partisans of Don Carlos and those of the queen Isabel II., the priests became the most zealous champions of Don Carlos, and their enthusiasm acted so powerfully upon the impetuous spirit of young Cabrera, that he joined in 1833 a small band of guerrillas. He fought with singular ferocity, which rose to fury, when, 16 Feb. 1836, upon the order of the queen and of Mina, Gen. Nogueras put to death Cabrera's

CABRERA — CACERES

aged mother and his three helpless sisters. Cabrera took vengeance upon all the Christinists who fell into his hands. His enemies treated him like a wild animal, and hunted him, after he had laid waste Aragon, Valencia, and Andalusia, from one place to another. After a temporary defeat at Torre Blanca he eventually took Morella. Hence in 1838 Don Carlos created him Count de Morella, and at the same time lieutenant-general, and in this capacity Cabrera continued to fight for the cause of the pretender, and for what he considered the cause of the priesthood and the Church, until 1840, when he was compelled to flee to Paris. By order of Louis Philippe he was arrested and consigned to the fortress of Ham, but was soon set free. In 1848 the French revolution filled Cabrera with the most sanguine expectations; which, however, were doomed to disappointment, as on his arrival in Catalonia he was but indifferently received, and on 27 Jan. 1849, he was severely wounded at Pasteral, although he succeeded in making good his escape to France. In August of the same year he took up his abode in London, where he married a rich English woman. When Alphonso XII. was proclaimed king of Spain in 1875 Cabrera advised the Carlists to submit to him.

Cabrera, ka-brā'ra, a small Spanish island, one of the Balearic Isles, about 10 miles of Majorca. It is about three miles in length and breadth and the coast is irregular. The chief industry of the island is fishing and the permanent population is very small. During the war in the Peninsula Spain used it as a place for receiving convicts.

Cabrilla, or **Hind**, one of the sea-basses (*Epmphelus maculatus*) found in the Atlantic from Charleston to Brazil. It attains a length of 18 inches and is highly esteemed as food. Another sea-bass (*Paralabrax maculatofasciatus*) living along the coast of lower California and highly regarded as a food-fish; is called the spotted cabrilla. See SEA-BASS.

Cabul, **Cabool**, or **Kabul**. See KABUL.

Cacao, ka-kā'ō, or kā'ko, or **Cocoa**, the name of several trees of the natural order *Byttneriaceæ* (q.v.), forming the genus *Theobroma*, the seeds of which furnish cocoa and chocolate. They are natives of the West Indies and South America. The chief is the *T. cacao*, which, both in size and shape, somewhat resembles a young cherry-tree, but separates near the ground into four or five stems. The leaves are about four inches in length, smooth but not glossy, and of a dull green color. The flowers are saffron-colored, and very beautiful. The fruit of the cacao-tree somewhat resembles a cucumber in shape, but is furrowed deeper on the sides. Its color while growing is green; but as it ripens this changes to a fine bluish-red, almost purple, with pink veins; or, in some of the varieties, to a delicate yellow or lemon color. Each of the pods contains from 20 to 30 nuts or kernels, which in shape are not much unlike almonds, and consist of a white and sweet pulpy substance, enveloped in a parchment-like shell. These are the cacao or chocolate nuts. Cacao is cultivated in the Antilles, in Mexico, Guatemala, Guiana, Venezuela, and also in Africa and Asia. The wild cacao-trees yield only one crop every year, between

February and May; the cultivated trees yield a second crop in August and September. The plantations are usually in marshy situations. As soon as the fruit is ripe it is gathered and cut into slices, and the nuts, which are at this time in a pulpy state, are taken out and laid in skins, or on leaves to be dried. They have now a sweetish acid taste, and may be eaten like any other fruit. When perfectly dry they are put into bags, and exported to foreign countries. Before being made into chocolate these nuts are generally toasted, after which their thin external covering is easily separated. The kernel is then pounded in a mortar, and subsequently ground on a smooth, warm stone. Sugar, and various kinds of spices, such as vanilla, cinnamon, cloves, long pepper, almonds, and other substances, are frequently added; and with the aid of water the whole is formed into a paste. This is put while hot into tin molds, where in a short time it congeals, and in this state it is the chocolate prepared for domestic use. Very often the chocolate sold in the shops is adulterated with flour, starch, and other matters. The purest form in which cacao is sold is what is called "cocoa nibs," which are the seeds or beans divested of their husks, and broken by pressure. By the natives of South America the cacao beans are used for food. A white oily matter, about the consistence of suet, is also obtained by bruising them and boiling the pulp. The oil is by this means liquefied and rises to the surface, where it is left to cool and congeal, that it may the more easily be separated. This, which is called "butter of cacao," is without smell, and when fresh has a very mild taste. Its principal use is as an ingredient in pomatums. From the nuts, when slightly roasted, an oil is sometimes obtained by pressure, which is occasionally used in medicine.

Butter of Cacao.—The oily part of chocolate, expressed between heated plates, is known as "butter of cacao" or "cocoa butter." It is solid at ordinary temperature, but melts at that of the body. It is used as an application to the skin in massage, and is a basis for the manufacture of suppositories and ointments. In hot countries it is used for butter.

Ca'capon, or **Great Cacapon**, a river in West Virginia. It flows nearly northwest through Hampshire and Morgan counties, and enters the Potomac about five miles from Berkeley Springs. Its length is about 140 miles.

Caccianiga, **Antonio**, Italian writer: b. Treviso, 1823. He founded a satirical magazine called 'Lo Spirito Folletto' at Milan in 1848; being exiled after the revolution of 1848 was for six years a journalist in Paris. He has been mayor of Treviso subsequently, and is the author of 'Il proscritta' (1853); 'Bozzetti morali ed economici' (1869); 'La Vita Campestre'; 'Villa Ortensia' (1876).

Caccini, kā-chē'nē, **Giulio**, Italian composer: b. Rome about 1546; d. Florence, 1618. He was styled the father of a new music, having been the first to write an opera for performance in a public theatre. His works include 'Daphne,' and 'Apollo's Battle with the Serpent.'

Caceres, **Andres Avelino**, Peruvian military officer and statesman: b. Ayacucho, 11 Nov. 1838. In the Chilean war (1879-83), he was

CACERES — CACIQUE

colonel, general, and, after the taking of Lima, second vice-president in the provisional government. The imprisonment of Calderon, the president, and the absence of the first vice-president made him acting president of Peru. Afterward, by a general election, he was inaugurated president (1886). The country prospered greatly under his administration, and his successor in the presidency appointed him minister to France and Spain. On the death of President Bermudez in 1894, Gen. Caceres was proclaimed dictator, and on 10 May was elected president. In 1895 he was overthrown in a revolution headed by ex-Dictator Pierola, who was elected president 10 July.

Caceres, kă'thā-rēs, Spain, a town in Estremadura, capital of the province of the same name, 24 miles west by north of Truxillo. It consists of an old and a new town, the former crowning the top of a hill, and surrounded by a strong wall flanked with towers, and the latter built round it on the lower slopes. The houses are tolerably well built, but the streets are mostly narrow and steep. Among the objects worthy of notice are four churches, several old feudal mansions, and the bull-ring. Pop. (1902) about 16,000. The province of Caceres is the second largest of Spain, in the north of Estremadura, owned chiefly by large proprietors, and mostly devoted to cattle-raising; the north half is a good wine country. The area is over 8,000 square miles, and the population about 400,000.

Caceres Nueva. See NUEVA CÁCERES.

Cachalot. See SPERM WHALE.

Cachar, kă-chār', a district of Assam, India, bounded east by Manipur and the Naga Hills, south by the Lushai Hills, west by Sylhet and the Jaintia Hills, and north by Nowgong district. It comprises a series of fertile valleys diversified by low hills and almost surrounded by mountain ranges. The Barak River flows through the district, its course here being about 130 miles. Lignite, and petroleum have been found. Salt is manufactured in small quantities. The forests are of great extent, and constitute the chief natural wealth of the district. Rice and tea are extensively cultivated. Area, 2,472 square miles; pop. (1902) 467,300. The chief town is Silchar.

Cache, the name of (1) a river in Arkansas, flowing northwest about 150 miles into the White River, near Clarendon, Monroe County; (2) a peak of the Rocky Mountains in Idaho, height 10,451 feet; (3) a fertile valley in the Wasatch Mountains in Utah and Idaho. It is 60 miles long and from 10 to 20 miles wide, and has an altitude of 5,000 feet. It is watered by the Bear River, and has several villages, of which Logan is the largest.

Cache, kăsh, a hole in the ground for hiding and preserving provisions which it is inconvenient to carry; used by settlers or travelers in unpeopled parts of North America, and by Arctic explorers.

Cachet, *Lettres de*, lètr dè kă-shā, a term formerly applied especially to letters proceeding from and signed by the kings of France, and countersigned by a secretary of state. They were at first made use of occasionally as a means of delaying the course of justice, and appear to have been rarely employed before

the 17th century as arbitrary warrant for the detention of private citizens, and for depriving them of their personal liberty. During the reign of Louis XIV. their use became frightfully common, and by means of them persons were imprisoned for long periods, or for life, on the most frivolous pretexts. Sometimes, however, such arrests were favors on the part of the king, as they withdrew the accused from the severer punishment to which they would have been liable upon trial before the courts. *Lettres de cachet* were abolished at the Revolution.

Cachexy, kă-kěk'sī, or **Cachexia**, kă-kěk-sī-a, (Gr., "evil habit of body"), a morbid state of the bodily system, in which there is great weakness, with or without the local manifestation of some constitutional disease. It is not a disease of itself, but the result of diseases such as gout, cancer, lead-poisoning, tuberculosis, syphilis, intermittent fever, excessive use of alcohol, etc. Thus scrofulous cachexia means the condition of body due to scrofula, shown by slender form, narrow or deformed chest, pallor, diseased glands, large prominent joints, etc.

Cachexia Strumipriva. See THYROID GLAND, *Diseases of*.

Cachoeira, kă-shwā'ē-ra, Brazil, a town in the state and 62 miles northwest of Bahia. It stands on the Paraguassu, which divides it into two unequal parts and has often injured it by inundations, and is the entrepôt for the traffic of a large extent of surrounding country. The chief exports are coffee, cotton, and tobacco. Pop. 15,000.

Cacholong, a mineral of the quartz family, a variety of opal, often called pearl-opal. It is usually milk-white, sometimes grayish or yellowish white, opaque or slightly translucent at the edges. It often envelops common chalcodony, the two minerals being united by insensible shades. It also associates with flint and semi-opal.

Cachou, kă-shoo', an aromatic sweetmeat in the form of a silvered pill, used for giving an agreeable odor to the breath.

Cachucha, kă-choo'cha, an Andalusian dance, resembling the *bolero*, performed to a graceful air in 3-4 time and with a strongly marked accent.

Cacique, kă-sěk', or **Cazique**, a title borne by, or a designation given to, the chiefs of Indian tribes in Central and South America, Cuba, Haiti, etc. The term was formed by the Spaniards from a native Haitian word.

Caçique, one of several South American icterine birds, forming the genus *Cassicus*, and closely related to the Baltimore oriole (q.v.). They are sometimes uniform black, sometimes black relieved by chestnut, yellow, green, or scarlet; the bill is frequently white instead of the usual black or brown. The caçiques are noted for their intricately woven, pouch-like nests, composed of thin bark and grasses, several of which, sometimes a yard in length, hang from the outer twigs of a single branch of some large tree, usually overhanging the water, as an extra precaution of safety against monkeys and snakes.

CACODYLE — CACTUS

Cac'odyle, or **Cac'odyl**, kāk'ō-dīl, -dīl (Gr., "having a bad smell"), in chemistry, a monad radical having the formula $\text{As}(\text{CH}_3)_2$, and of special interest to the chemist because it was the first radical known in which a metal or a metalloid is combined with an organic base. The compound $\text{As}_2(\text{CH}_3)_4$, which was discovered by Bunsen in 1837, and which can exist in the free state, is often called cacodyle, but it is more correctly known as dicacodyle since its molecule consists of two cacodyle radicals. Dicacodyle is obtained in the pure state by heating cacodyle chloride with zinc in an atmosphere of carbon dioxide, but a mixture of cacodyle oxide and dicacodyle (known formerly as Cadet's fuming liquid) may be obtained by distilling potassium acetate with an equal weight of arsenic trioxide. Mercuric oxide (HgO) converts both of the constituents of Cadet's liquid into cacodylic acid, $(\text{CH}_3)_2\text{AsO}(\text{OH})$; and this, in turn, is converted into cacodyle chloride, $\text{As}(\text{CH}_3)_2\text{Cl}$, by the action of corrosive sublimate and fuming hydrochloric acid. Cacodyle oxide (known also as alkarsin) may be obtained in the pure state by distilling the chloride with an aqueous solution of caustic potash in an atmosphere of carbon dioxide. Dicacodyle is a colorless liquid, heavier than water, boiling at 338°F ., and characterized by an intensely disagreeable smell suggestive of garlic. It takes fire spontaneously when exposed to the air, and its vapors are extremely poisonous. Dicacodyle is known to the chemist as tetra-methyl di-arsenid.

Cacoëthes, an ill and irrepressible propensity or habit. The term is chiefly used in the phrase *cacoëthes scribendi*, an itch for writing books.

Cacolet, kāk'ō-lā, a contrivance somewhat resembling a double arm-chair, or in other cases like a bed, fixed on the back of a mule or horse, for carrying sick persons or travelers in mountainous countries. Cacolets have also been used in warfare for carrying wounded soldiers.

Cacomistle, kāk-ō-mīs-ēl, a small Mexican animal (*Basariscus astutus*), closely related to the raccoon, and similar in its haunts and habits. It is slender, about 10 inches long, with a sharp, fox-like face, large bright eyes surrounded with light patches, and erect ears. The long, soft fur is light brown above, darker along the back; the under parts are white, and the bushy tail has six broad white rings running around it. It is often tamed, and is called the American "civet-cat" by the miners, who keep it as a pet and mouser.

Cacongo, kā-kōng'gō, or **Kakongo**, a former district of Guinea, Africa, extending along the South Atlantic Ocean, in lat. 5°S ., just north of the mouth of the Congo. The Cacongo River enters the sea in lat. $5^\circ 12' \text{S}$. This territory was claimed by the Portuguese, and Cabinda is the northern part of it; the south and east to the Congo have been absorbed in the Congo Free State.

Cactacæa. See CACTUS.

Cactus, the common name for all members of the family *Cactacæa*, an order of calycifloral dicotyledons, found in luxuriance in the arid sections of the United States and both Americas. Both the Greeks and Latins were perfectly familiar with this curious monstrosity of nature,

the word being *kaktos* in Greek and *cacti* in Latin. Linnæus included all this species under the one generic term cactus, of which there are about 1,000 species. One of these is a native of Ceylon, with which the ancients were familiar. But the true home of the cactus is in America, where our otherwise arid plains and deserts are covered with it. Like the water-melon, it has the faculty of absorbing into itself from the air and earth, a vast bulk of water, making its stem most succulent. For this reason it is often called "the spring of the desert." The Mexicans are most proficient in finding uses for this plant, making drink, food, and clothing from it. Many medical scientists attribute the freedom of these people from diabetes and other forms of kidney trouble to the free use of the sap of the cactus as a beverage. It is said to be a sure cure for the earlier stages of this trouble. From the agave, a species of a similar family, pulque and mescal, the two national drinks of Mexico, are brewed. That vast arid plateau of which Arizona, portions of New Mexico and Texas are a part, is covered with countless varieties of cactus. The Spanish-speaking people call some of this territory "Llano Estacado" — the staked plain — because of the multitude of dead stalks of the *Cercus giganteus* which rise to a height of sometimes 20 feet. These bloom but once, usually at the end of 10 or 12 years of slow growth, and then die, the stalks remaining in the ground. These are commonly called the "century plant," from the supposition that they bloom but once a century. The yucca, another species, often grows to more heroic proportions, even, sometimes reaching its uncouth branches upward for 30 or 40 feet. The horses and cattle on these southern ranges find in the cactus relief from thirst, being expert in breaking down the spines, with which it is covered, with their hoofs. The Navajo and other Indian tribes of the Southwest use these spines as needles with which to weave their marvelous blankets. As the date-palm is to the Arab, so is the cactus to the Indian, — a weird provision of the Creator to overcome obstacles for man. The most common kind, met with all over western America, is the *Opuntia coccinellifera*, which grows as a succession of small, oblong, thick leaves, covered, like most of its kind, with many spines. Because of these spines it is used for hedges, particularly the variety called "prickly pear." The cochineal insect feeds on these *Opuntia* plants, making it of commercial value. The cultivation of the cactus family in northern hot-houses and parks is becoming more and more popular, as the species is capable of being trained into wonderfully grotesque shapes, producing flowers of great size and beauty. In the new botanical gardens at Bronx Park, New York city, are perhaps some of the finest illustrations of this training. The seaside resorts of California (like Coronado Beach) are beautified with countless specimens of cactus, as are all the public parks and private gardens of that State. Even the birds find a use for the cactus, for a variety of wren builds and lives upon it. Our American deserts would lose much of their attractive charm were it not for this humble vegetation in their lava-beds and sand.

The flowers and stems of the night-blooming cereus (*Cercus grandiflorus*) have been used

in medicine, in the form of a fluid extract, as a cardiac stimulant. Its action resembles that of digitalis, but is less uniform.

Cactus Wren, a small wren (*Campylorhynchus brunneicapillus*) inhabiting the arid and desolate regions of the Mexican border. It is grayish brown above, darker on the head, nearly pure white beneath, with a spotted breast, and a white line over the eye. It makes a large flask-shaped nest of grasses and twigs, lined with feathers, and laid in the crotch of a cactus. This nest is entered by a covered way or neck several inches in length. It is a very sprightly bird with a clear, ringing song.

Ca'cus, in Roman legend, a huge giant, in some accounts a son of Vulcan, who lived in a cave on Mount Aventine. Having stolen and dragged into his cave some of the cattle which Hercules had carried away from Geryon in Spain, he was killed by that hero, who discovered his place of hiding by the lowing of the oxen within, in response to the lowing of the remainder of the flock as they were passing the entrance of the cave.

Cada Mosto, ká'da mō'stō, or **Ca da Mosto**, Alois da, Italian navigator: b. Venice about 1432; d. 1464. In 1455 he departed from Lagos, sailed into the river Senegal, which had been discovered five years before, and after trading in slaves and gold he steered for Cape Verd, where he joined two other discovery ships, and visited, in company with them, the mouths of the Gambia, the riches of which had been greatly extolled. In 1456 Cada Mosto, in company with two other ships, made a second voyage to the Gambia. On the way thither they discovered the Cape Verde Islands. The description of his first voyage, 'Il Libro de la prima Navigazione per l'Oceano alle Terre de' Negri della Bassa Etiopia, di Luigi Cada Mosto' (Vicenza 1507, and Milan 1519), the oldest of the voyages of the moderns, is a masterpiece. The arrangement is admirable, the narrative interesting, the descriptions clear and accurate.

Cadamba, kā-dām'ba, or **Kudumba**, the wood of several species of *Nauclea*, an Indian genus of *Cinchonacæ*. *N. (Uncaria) gambir* is the source of gambier.

Cadas'tral Survey (F. *cadastre*, from It. *catastro*, from low Lat. *capitastrum*, "a register for a poll-tax"; Lat. *caput*, "the head"), a territorial survey in which objects are represented in their relative positions and magnitudes. A cadastral survey differs from a topographical one, in not magnifying the principal objects. It requires consequently to be made on a larger scale than the topographical survey, so as to admit of a proportionally accurate representation of towns, houses, roads, rivers, etc. The scale on which the map of the United Kingdom is being prepared 2300 of the linear measure of the surface surveyed, is an example of the scale of a cadastral survey. This scale nearly corresponds with 25 inches to the mile. See ORDNANCE SURVEY.

Caddis-fly, the common name of any of the order *Trichoptera*, a group of aquatic insects, related to and by many supposed to be the ancestors of the moths and butterflies (*Lepidoptera*). They resemble the lower moths, but the wings are not scaled, except in a very

rudimentary way. They differ from moths in having no true "tongue" or well-developed maxilla adapted for sucking the nectar of flowers, but as in moths the mandibles are either absent or obsolete. About 150 species are thus far known to live in North America. The larvæ are called "caddis-worms," "case-worms," or "cad-bait." They are more or less cylindrical, with well-developed thoracic feet, and a pair of feet on the end of the abdomen, varying in length. The head is small, and like that of a tortricid larva, which the caddis-worm greatly resembles, not only in form, but in its habit of rolling up submerged leaves. They also construct cases of bits of sticks, sawdust, or grains of sand, which they drag over the bottom of quiet pools, retreating within when disturbed. They live on vegetable matter and on water-fleas (*Entomostraca*) and small aquatic larvæ. When about to pupate they close up the mouth of the case with a grating, or, as in the case of *Helicopsyche*, which is coiled like a snail-shell, by a dense silken lid with a single slit, and in some instances spin a slight, thin, silken cocoon, within which the pupa state is passed. The pupa is much like that of the smaller moths, except that the mandibles are present, and wings and limbs are free from the body. After leaving its case it makes its way over the surface of the water to the shore, sometimes going a long distance. The female deposits her eggs in a double gelatinous, greenish moss, which is attached to the surface of some aquatic plant. Consult: McLachlan, 'Monograph of the Trichoptera of the European Fauna'; Banks, 'A List, Synopsis, Catalogue, and Bibliography of the Neuropteroid Insects of Temperate North America'; 'Transactions of the American Entomological Society,' Vol. XIX; also a paper by Newham and Betten in 'Bulletin of the New York State Museum,' 47.

Caddoan (kā'dō-an) **Indians**, a family of North American Indians, comprising the Arikari tribe in North Dakota; the four Pawnee villages, Grand, Tapage, Republican, and Skidi, in the Indian Territory; and the Caddo, Kichai, Wichita, and other tribes, formerly in Louisiana, Texas, and Arkansas. The present number of these Indians is about 2,130, of which 416 are in North Dakota, the rest in the Indian Territory.

Cade, John (the Jack Cade of Shakespeare), Irish rebel: d. 11 July 1450. Early obliged to flee from Ireland, he took refuge in France. In 1450 he passed over to England at the moment of great popular dissatisfaction with the ministers of Henry VI. He at once pretended to be a relative of the Duke of York, assumed the name of Mortimer, raised the standard of rebellion in Kent, 8 May, and very soon found himself at the head of 20,000 men. He advanced to Blackheath, and interchanged notes with King Henry, to whom he made known the griefs of his companions. He defeated the royal troops which were sent against him, and entering London, 1 July, immediately caused the execution of two of the offensive ministers. At first he kept his army under rigorous discipline, but after a few days' residence in the capital their propensity to plunder could no longer be restrained, and they pillaged some of the finest houses. This aroused the citizens against them, and on the night of 5

July Cade met with his first defeat. A promise of pardon now dispersed most of his followers, and finding his force no longer sufficient for resistance he took to flight, but was overtaken and killed.

Cade, Oil of, a thick oily liquid obtained in France, Spain, and northern Africa by the dry distillation of the wood of *Juniperus oxycedrus*, of the pine family (*Comferæ*). It has a not unpleasant tarry odor, and is largely employed in the treatment of skin diseases, especially certain forms of eczema.

Cadell', Francis, Scottish explorer in Australia: b. Cockenzie, Scotland, 1822; d. 1879. Becoming assured of the navigability of the Murray River in Australia he made an extended exploration of that stream in 1850. Subsequently forming a navigation company he reached by steamboat a point 300 miles from the river's mouth, and in 1858 explored the Murrumbidgee River, and in 1858 the Darling River as far as Mount Murchison. While in command of a vessel sailing from Amboyna he was murdered by his crew.

Cadenabbia, kă-dě-năb'bē-ă, a health resort, beautifully situated among orange and citron groves, on the western shore of Lake Como, Italy. Its famous Villa Carlotta contains works by Canova and Thorwaldsen.

Cadence, the concluding notes of a musical composition or of any well-defined section of it. A cadence is perfect, full, or authentic when the last chord is the tonic preceded by the dominant; it is imperfect when the chord of the tonic precedes that of the dominant; it is plagal when the closing tonic chord is preceded by that of the subdominant; and it is interrupted, false, or deceptive when the bass rises a second, instead of falling a fifth.

Cadency, in heraldry, a system of marks intended to show the descent of a younger branch of a family from the main stock.

Caden'za, in music, a flourish of indefinite form introduced upon a bass note immediately preceding a close.

Cad'er Id'ris, a mountain in Merionethshire, Wales, the beginning of a chain running northeasterly. The ridge is nearly 10 miles long, and with its breadth of from one to three miles makes an elevation of great massiveness. Its greatest height is 2,925 feet.

Cadet-Gassicourt, Louis Claude, 100-e klöd ka-dă-găs-i-koor, French scientist: b. 1731; d. 1799. He filled several important offices, such as apothecary to the Hôpital des Invalides, inspector of French hospitals in Germany, and chemical director to the Sèvres Porcelain Works. He published a variety of researches in pure and applied chemistry, but is best known by the fuming liquor still called by his name, and the subject of an elaborate research by Bunsen.

Cadet de Vaux, Antoine Alexis, ân-twăn ä-lăks-is kă-dă-dě-vô, French chemist: b. Paris, 1743; d. 1828. He was at first an apothecary, but for many years devoted himself to agriculture, writing on the effect which the destruction of mountain forests has in diminishing the copiousness of the springs in the valleys, the improvement of vineyards, the cultivation of foreign plants, and the providing of

substitutes for the usual articles of food in times of scarcity. He was one of the principal editors of the 'Journal d'Economie rurale et domestique,' and of the 'Cours complet d'Agriculture pratique.'

Cadet, kă-dět', a word having several significations.

1. A younger son of a family; that is, one junior to the eldest or heir by primogeniture.

2. In the former French military service, a gentleman who served in the ranks without pay, for the purpose of learning the art of war.

3. In the United States and Great Britain a pupil of a military or naval academy or training-ship, as of the United States Military Academy at West Point; the United States Naval Academy at Annapolis; the Royal Military Academy at Woolwich; or the Royal Military College at Sandhurst.

Cadet's Fuming Liquid. See CACODYLE.

Cadi, kă'dē, or **Kadi**, in Arabic, a judge or jurist. Among the Turks cadi signifies an inferior judge, in distinction from the mollah, or superior judge. They belong to the higher priesthood, as the Turks derive their law from their prophet.

Cadillac, Antoine de la Mothe, ân-twăn də lâ môt kă-dē-yak, French military commander: b. Gascony, France, about 1660; d. France, 1720. He came of good family, and having entered the army was for some time captain in Acadia. In 1694 Frontenac placed him in command of Michilimackinac, where he remained until 1697. Cadillac then brought to the attention of Louis XIV. a well-considered scheme for a permanent settlement and trading post in the Northwest. On receiving the monarch's approval he founded Detroit in 1701, establishing 50 soldiers and 50 settlers at that point. From 1712 to 1717 he was governor of Louisiana, returning to France in the year last named. The town of Cadillac, Mich., was named in his honor. Consult: Burton, 'Cadillac's Village, a History of the Settlement, 1701-10' (1896); Parkman, 'A Half Century of Conflict' (1892).

Cadiz, kă'dēth or kă-dīz (anciently GADES), a seaport, and one of the handsomest cities in Spain, is situated at the extremity of a long tongue of land projecting from the Isla de Leon, off the southwestern coast of Andalusia. The narrowness of the land communication prevents its capture by a military force while the garrison is master of the sea. It is walled, with trenches and bastions on the land side; the houses are high, and the streets narrow. The chief buildings are the great hospital, the custom-house, the old and new cathedrals, two theatres, the bull-ring, capable of accommodating 12,000 spectators, and the light-house of St. Sebastian. From the harbor the town has a fine appearance. The Bay of Cadiz is a very fine one. It is a large basin enclosed by the mainland on one side, and the projecting tongue of land on the other. It is from 10 to 12 leagues in circumference, with good anchorage and protected by the neighboring hills. It has four forts, two of which form the defense of the grand arsenal, La Caracca, in which are 3 basins and 12 docks. Cadiz has long been the principal Spanish naval station. It was the centre of the Spanish-American trade, and the

CADIZ — CADMUS

commerce of the port was very extensive before the separation of the colonies. The preparation of salt from pits belonging to the government was formerly an important branch of industry, but is now of comparatively little consequence. The manufactures of Cadiz are of comparatively little importance, but in regard to the extent and value of its commerce it ranks as one of the first ports in Spain. Its imports consist of all kinds of foreign and colonial produce, coal, cotton, and woolen manufactures, etc.; its exports of wines, fruits, oils, and other products of Spain. The town of Santa Maria, opposite Cadiz, is the principal depot of the wines of Xeres. Notwithstanding the political agitations of recent years, the commerce of Cadiz has continued comparatively prosperous. Cadiz was founded by the Phenicians about 1100 B.C., and subsequently belonged in succession to the Carthaginians and the Romans. It was taken by the Earl of Essex in 1596, and from its bay Villeneuve sailed previous to the battle of Trafalgar in 1805. In 1809 it became the seat of the central junta, and afterward of the Cortes. It sustained a long blockade from the French (1810-12), which was not raised till after the battle of Salamanca. In 1823 the French entered it after a short siege. An insurrection occurred in Cadiz in 1868, and the town was declared in a state of siege in December, but in the following January the siege was raised. Pop. (1897) 70,177.

Cadiz, Ohio, a village and county-seat of Harrison County, about 25 miles northwest of Wheeling, W. Va., and 120 miles east northeast of Columbus. Cadiz has commercial interests of some importance, and is the commercial center of a great wool-growing district. It is also noted as a banking centre. Cadiz was the home of Edwin M. Stanton (q.v.). Pop. (1900) 1,755.

Cadmea, the name given to the acropolis of Thebes, Bœotia, because it was said to have been founded by Cadmus. Only fragments of its walls remain.

Cadmia, a name used by early writers (1) for the mineral calamine (q.v.); and (2) for the sublimate of zinc oxide that often collects on the walls of furnaces used in the reduction of metallic ores, when those ores happen to contain zinc.

Cad'mium, a metallic element resembling zinc in its chemical properties, and discovered by Stromeyer in 1817, in a specimen of zinc carbonate. Cadmium often occurs in ores of zinc to a small extent, blende sometimes containing as much as 3 per cent of cadmium sulphide. The commercial supply of the element is obtained as a by-product in the smelting of zinc, chiefly in Belgium and Silesia. Cadmium sulphide also occurs native as the mineral greenockite (q.v.), otherwise known as "cadmium blende." In the distillation of zinc ores the cadmium, being more volatile, passes over first; and advantage is taken of this fact for the isolation of the metal in the arts. In Silesia, where the zinc ores often contain considerable quantities of cadmium, the first portion of the distillate is likely to contain as much as from 3 to 10 per cent of cadmium. This is mixed with coal or charcoal and redistilled at a low, red heat. Cadmium, mixed with a little zinc,

passes over; and by one more distillation the metal is obtained in a fairly pure form. To eliminate the last traces of zinc, the crude metal is dissolved in hydrochloric acid, and its sulphide is then dissolved in concentrated hydrochloric acid, and the subsequent addition of carbonate of soda precipitates the carbonate of cadmium, which is reduced to the oxide upon ignition. The pure oxide thus obtained may then be reduced to the metallic form by distillation with charcoal.

Metallic cadmium is lustrous and resembles tin in appearance, though it has a bluish tinge. It is stronger than tin, but, like that metal, it emits a peculiar crackling sound, or "cry," when bent. At ordinary temperatures it is quite ductile and malleable, and may be drawn into thin wire, rolled into thin sheets, or hammered into foil. At about 175° F. it becomes brittle, however, so that it can be pulverized in a mortar. Cadmium has the chemical symbol Cd. Its specific gravity is about 8.65. It melts at 600° F., and boils at about 1,500° F., yielding a yellow vapor. Its atomic weight is 112.4 if O=16, or 111.6 if H=1. Its specific heat is about 0.055, and its linear coefficient of expansion is about 0.0000185 per Fahrenheit degree. Metallic cadmium is used to a limited extent in the preparation of alloys, its general effect being to reduce the melting-point of the alloy to which it is added. The total production of the metal per annum is probably about two tons.

In its chemical relations, cadmium, like zinc, is a dyad. Metallic cadmium undergoes a slow, superficial oxidation upon exposure to the air; and when sufficiently heated in the presence of air it oxidizes rapidly and may even take fire. The resulting oxide, CdO, is brown in color and readily dissolves in acids, with the production of the corresponding cadmium salts. One of the best known of these salts is the iodide, CdI₂, which is used in photography and in medicine, and may be obtained by the action of hydriodic acid, HI, upon cadmium carbonate, or metallic cadmium. The bright yellow sulphide, CdS, is formed when the stream of sulphuretted hydrogen gas is passed through a slightly acid solution of a cadmium salt; and this fact is used in the detection and isolation of cadmium in qualitative analysis. The sulphide is used as a pigment, under the name of "cadmium yellow"; it is brilliant in color, and does not change upon exposure to air or light.

Cad'mus, in Greek mythology the son of Agenor and grandson of Poseidon. With his brothers he was sent by his father to seek for his sister, Europa, who had been carried away by Zeus, and he was not to return without her. After several adventures, the oracle at Delphi commanded him to desist from further search, to intrust himself to the guidance of a heifer, and where she should stop to build a city. He accordingly went to Bœotia, where he wished to sacrifice the cow to Athena. But his companions, attempting to bring water from the fountain of Ares for the purpose of the sacrifice, were slain by the dragon that guarded it. Cadmus killed the dragon, and, at the command of Athena, sowed its teeth in the earth; armed men immediately sprang up, whom he

called Sparti (the sowed), but who perished in a contest with each other, excepting five. With the remainder he built the city of Cadmea or Thebes (see THEBES). He became by his marriage with Harmonia the father of Antinoe, Ino, Semele, Agave, and Polydorus. After ruling for a time the city which he had built, and the state which he had founded, he proceeded, at the command of Bacchus, with Harmonia to the Enchelæ, conquered their enemies, the Illyrians, became their king, and begat another son, Illyrius. Tradition states that Cadmus came to Læotia from Pænicia, 1550 B.C., conquered the inhabitants who opposed him, and, in conjunction with them, founded the above-mentioned city. To promote the improvement of his subjects he taught them the Phœnician alphabet, the employment of music at the festivals of the gods, besides the use of copper, etc. Another Cadmus, of Miletus, a son of Pandion, was regarded among the Greeks as the first who wrote in prose. He lived about 600 B.C.

Cado'gan, George Henry (5TH EARL), English statesman: b. Durham, 12 May 1840. He was educated at Christ College, Oxford, and entered Parliament as member for Bath in 1873, becoming under-secretary for war in 1875, and under-secretary for the colonies, 1878-80. He was lord privy seal, 1886-95, and lord-lieutenant of Ireland, 1895-1902.

Cadol, Victor Edouard, vĕk-tôr ěd-oo-ărd ka-dôl, French dramatist: b. Paris, 1831; d. 1898. He was long prominent as a journalist, being on the staff of 'Le Temps' and one of the founders of 'L'Esprit Français.' Among his very numerous works, many of which were written in collaboration, are 'Les ambitions of de M. Fauvel' (1867); 'Thérèse Gervais' (1893); 'L'archiduchesse' (1897). A collected edition of his dramas appeared in 1897 entitled 'Théâtre inédit.'

Cadoo'bergia Wood. See EBONY.

Cadore, kă-dô'ră, or **Pieve di Cadore**, a town of Italy, in the province and 22 miles north-northeast of the town of Belluno, on the Piave, derives its chief interest from being the birthplace of Titian.

Cadorna, Raffaele, răf-fă-ĕl' kă-dôr-na, Italian general: b. Milan, 1815; d. Turin, 6 Feb. 1897. He served in the Crimean war, and in 1860 was made war minister in Tuscany's provisional government, and military commandant of Sicily in 1866. He suppressed the Bourbon insurrection in Palermo in the latter year, and in 1870 captured Rome and was its military governor for a time. In 1871 he entered the Italian Senate. He was the author of 'La liberazione di Roma nel 1870' (1889).

Cadoudal, Georges, zhôrzh kă-doo-dal, French Chouan chief: b. Brittany, 1 Jan 1769; d. Paris, 25 June 1804. In the protracted and sanguinary contests between the Royalists and Republicans during the French Revolution, the Chouans and Vendéans were the most resolute supporters of the Royal cause; and the energy and ability of Cadoudal soon raised him to an influential place among the adherents of the house of Bourbon. At this time attempts were made by Napoleon to gain over Cadoudal to the cause of the republic, and a lieutenant-generalship in the army was offered as the price of his submission; but he firmly declined all

these overtures. He afterward engaged, in concert with Gen. Pichegru and others, in a conspiracy having for its object the overthrow of the consular government and the restoration of the monarchy; which being discovered, Cadoudal was arrested, and executed. See CHOUANS.

Caduceus, ka-dŭ'se-ŭs, the winged staff and official symbol of Mercury, or Hermes. It is a wand of laurel or olive, with two little wings on the upper end, about which two serpents are twisted. It was borne by the ancient heralds, whose persons were then sacred and inviolable. The fable tells that Apollo gave his staff to Mercury in consideration of his resigning to him the honor of inventing the lyre. As Mercury entered Arcadia with this wand in his hand he saw two serpents fighting together; he threw the staff between them, and they immediately wound themselves around it in friendly union. The caduceus is Mercury's peculiar mark of distinction. With this he conducted the shades to the lower world, and from it received the name of Caducifer; yet we find it on ancient coins in the hands of Bacchus, Hercules, Ceres, Venus, and Anubis. Among the moderns it serves principally as an emblem of commerce.

Cadwalader, kăd-wôl'ă-dēr, **George**, American lawyer and soldier: b. Philadelphia, 1804; d. there, 3 Feb. 1879. He practised law till 1846; was made brigadier-general of volunteers; and won distinction at Chapultepec. He resumed his law practice till 1861; became major-general of State volunteers; was placed in command at Baltimore; accompanied Patterson's expedition to Winchester (1861); and, as one of a military board, directed the United States army operations.

Cadwalader, John, American soldier: b. Philadelphia, 10 Jan. 1742; d. Shrewsbury, Pa., 10 Feb. 1786. At the outbreak of the Revolution he was placed in command of a battalion and soon became brigadier-general. He fought at Trenton, Brandywine, Germantown, and Monmouth. In 1777 he organized the militia of eastern Maryland. In 1778 he challenged and wounded Thomas Conway for plotting against Washington. His daughter became, in 1800, the wife of Lord Erskine.

Cadzand, kăd-zănd', or **Cadsand**, a small port of Zeeland, in Holland, near the Belgian frontier. It was a great mediæval port, and here in 1337 the English, under Sir Walter Manny and the Earl of Derby, defeated the Flemings in French pay.

Cæcilian, sĕs-ĭ-lĭ'i-dē, a member of a family of batrachians, the *Cæciliidæ*, regarded as forming an order, called Apoda, or Gymnophiona. They are long, worm-like animals, lacking all traces of limbs, and having only a rudiment of a tail. There may be as many as 250 vertebrae. The hinder end is blunt and hardly to be distinguished from the head. The body is covered with a soft, moist skin, and the jaws are armed with rather feeble teeth. These animals are found in the tropical parts of America, Africa, and Asia, where they burrow like earthworms, which they resemble. They are often found in the nests of ants, which they devour. They also feed on worms. The breeding habits of these creatures are very interesting, but are not well understood. The eggs are laid either

in the water or near it. One species found in Ceylon lays a mass of eggs which are connected by a cord, thus resembling a string of beads. They are deposited in a burrow near the water, and are incubated by the mother until the escape of the young. About 30 species of these animals are known.

Cæcilius Stâtus, sê-cîl'-î-ûs stâ'shî-ûs, Roman comic poet: b. Milan, about 200 B.C.; d. 168 B.C. His contemporaries ranked him with Plautus and Terence. He wrote over 30 comedies of which fragments remain.

Cæculus, sêk'û-lûs, in mythology, a son of Vulcan, and a great robber, who lived in Italy, and built Præneste.

Cæcum, sê'kûm, a blind process or sac in the alimentary canal of various animals. In fishes the cæca are often numerous and long; and birds have generally two near the termination of the intestines. Mammals have commonly only one. In man the "blind-gut" is small and situated at the beginning of the colon. See INTESTINE.

Cædmon, kâd'môn, the first Anglo-Saxon poet: d. 680. According to Bede's 'Ecclesiastical History' Cædmon was a swine-herd to the monks of Whitby, and never gave evidence of any poetical talent until one night a vision appeared to him, and commanded him to sing. When he awoke, he found the words of a poem in praise of the Creator of the world impressed upon his memory. This manifestation of talent obtained for him admission into the monastery at Whitby, where he continued to compose devotional poems. An edition of his paraphrase of parts of the Scriptures was printed at Amsterdam in 1655, edited by Junius. Thorpe published an edition of it (London 1832) for the Society of Antiquaries. It has been assumed by some that Milton took some ideas of 'Paradise Lost' from the poems of Cædmon. It is certain that they were very popular among the English and the Saxon part of the Scottish nation, and furnished plentiful materials to the makers of mysteries and miracle plays. In the Bodleian Library at Oxford is a manuscript the contents of which are ascribed to Cædmon, but the best authorities do not consider it to be his. Consult: Ten Brink, 'Early English Literature'; Morley, 'English Writers,' Vol. II. (1888).

Cælius Aurelianus, sê'lî-ûs ô-rê-lî-â'nûs, Latin physician, generally supposed to have been a native of Numidia, and to have flourished in the 2d century of the Christian era. He was a member of the sect of the Methodici, and the author of a medical work still extant. In this work, 'De Morbis Chronicis et De Morbis Acutis,' Cælius divides diseases into two great classes, the acute and the chronic.

Cælius Mons, sê'lî-ûs môns, one of the seven hills on which Rome was built. It is said to have received its name from Cælius Vibenna, an Etruscan, to whom it was assigned. The palace of Tullus Hostilius was on this mount. It is at present covered with ruins.

Caen, kân, France, a town in the department Calvados, and the ancient capital of Normandy, 125 miles northwest of Paris, and about nine miles from the mouth of the Orne, which is here navigable and crossed by several bridges. There is a dock connected with the sea by both river and canal. Caen is the centre of

an important domestic trade, the market of a rich agricultural district, and carries on extensive manufactures. The streets are broad, regular, and clean, the houses well-built of white freestone, and it possesses various ancient and remarkable edifices. The public promenades and recreation grounds are beautiful, and there are various extensive squares and "places." The church of La Trinité, a fine edifice in the Norman-Romanesque style, restored in modern times, was formerly the church of the Abbaye-aux-dames, founded in 1066 by Matilda, wife of William the Conqueror. The church of St. Stephen was founded at the same time by William the Conqueror, as the church of the Abbaye-aux-hommes, and though considerably modified since is a noble and impressive edifice. It has two fine western towers 295 feet high. The Abbaye-aux-hommes, built by the Conqueror, who was buried in it, is now used as a college, having been rebuilt in the 18th century. One of the finest churches in Caen is that of St. Pierre, whose tower (255 feet), terminated by a spire, is exceedingly elegant. Among other public buildings are the Hôtel de Ville, the prefecture, and the palace of justice. Caen possesses a university faculty or college, a public library with some 100,000 volumes, a gallery of paintings with valuable works of old masters, a natural history museum, an antiquarian museum, etc. The hospital of the Abbaye-aux-dames is one of the best regulated in France. The hospital of the Bon-Sauveur is another admirable institution. The city was formerly fortified, and there are remains of a castle begun by William the Conqueror and finished by Henry I., but since much altered and now used as barracks. Caen first rose into importance in the time of William the Conqueror. In 1346 it was taken by Edward III., at which time it was said to be larger than any city in England except London. Henry VI. of England founded a university here in 1431. Caen having been in the possession of the English from 1417 to 1450. It suffered much in the religious wars between the Protestants and Roman Catholics of France. Admiral de Coligny captured it for the Protestants in 1562. Caen carries on ship-building, and its manufactures embrace linen, woolen, and cotton goods, lace, ropes, metal goods, and various other articles. It carries on a considerable trade in timber and other articles, including agricultural produce exported to England, to which also is still exported the Caen building stone famous for many centuries. Malherbe, Laplace, Elie de Beaumont, and Auber were born in this city or in its vicinity, and are commemorated by statues. Pop. (1901) 44,524.

Caen-stone, the French equivalent for the Bath oolite of England, a cream-colored building stone of excellent quality, got near Caen in Normandy. Winchester and Canterbury cathedrals, Henry VII.'s Chapel at Westminster, and many churches are built of it.

Cænopus, sê'nô-pûs, a genus of fossil rhinoceroses of the Oligocene Epoch in North America. This animal was hornless, smaller and less heavily proportioned than any living species, the Sumatran rhinoceros coming nearest to it in this respect.

Cænotherium, sê'nô-thê'rî-ûm, an extinct primitive ruminant, characteristic of the Oligocene formations of Europe. It was no larger

than the modern chevrotain of Java and had many archaic characters, the four-toed feet, short skull, and complete series of 44 teeth being the most remarkable. See RUMINANTS, FOS-SIL.

Caernarvon, kâr-nâr'vôn. See CARNARVON.

Cæruia'riu', Michael, Greek ecclesiastic, the Patriarch of Constantinople, 1043-9. By dispensing with the Latin ritual in many churches of Bulgaria and protesting against the use of unleavened bread by the Latins in the Eucharist, he completed the division between the Latin and the Greek communions. He was formally excommunicated by Pope Leo IX.

Cæsalpinieæ, sæs-äl-pîn'î-ê, a subdivision of the natural order of plants *Leguminosæ*, containing several genera. The botanical characteristics of the sub-order are: calyx in five divisions, joined together at different points, or often cleft to the base, with prefloration imbricated or valvular; petals equal or fewer in number; stamens often not symmetrical to the other parts of the flower, or very irregular, sometimes very numerous, sometimes partly abortive, rarely regular; very often free, or lightly joined together at the base only; ovaries raised on a free support, or joined in part to the calyx, and becoming legumes, which sometimes contain only one single or double ovule, and of which the pericarp may have a fleshy consistence; seeds without perisperm; embryo often straight; stalk arborescent or fruticose, sometimes creeping; leaves simple, or more frequently compound; in the latter case frequently bipinnate. The typical genus is *Casalpinia*, to which belong the Brazil-wood, Sapan-wood, Nicaragua-wood, etc.

Cæsalpinus, Andreas, än'drâ-as sæs-äl-pî-nûs, or **Andrea Cesalpino**, Italian physiologist: b. Arezzo, Italy, 1510; d. 23 Feb. 1603. He is first mentioned in public life as a professor of botany in the University of Pisa. He was subsequently made chief physician to Clement VII., and lived during the remainder of his life at Rome. He published works upon botany, mineralogy, medicine, and the highest questions of philosophy. In his first publication, entitled '*Speculum Artis Medicæ Hypocraticum*,' his knowledge of the system of the circulation of the blood is stated in the clearest manner. The following passage is taken from the second chapter of its first book: "For in animals we see that the nutriment is carried through the veins to the heart as to a laboratory, and its last perfection being there attained, it is driven by the spirit which is begotten in the heart through the arteries and distributed to the whole body." The system accepted since the time of Harvey could hardly be more definitely or accurately stated. Similar passages are found in other of his writings. His philosophical speculations are contained mainly in his '*Quæstiones Peripateticæ*.' This work had great success, especially after it had been violently attacked by Parker, archdeacon of Canterbury, and after a Frenchman named Taurel had gone through with what he called the alpine task of refuting it. The philosophy of Cæsalpinus was scholastic Aristotelianism, with a leaning toward some of the methods and doctrines of the later transcendental or absolute systems. He reduces the world to the simplicity of two only substances, God and matter, and

he makes all finite intelligences, all human, angelic, and demoniac souls, to belong to the latter element. Two things are remarkable about his system: (1) the boldness of speculation, unparalleled in his age, with which he seeks a purely scientific view of the universe; and (2) its entirely materialistic character. But more important than either his anticipation of Harvey's discovery, or his speculative opinions, were his botanical labors. He was styled by Linnæus the first orthodox or systematic botanist, and his work on plants was a hand-book to Linnæus in all his classifications. Botany in the time of Cæsalpinus was the popular witchcraft: as a science, it consisted in a mass of erudition about the imaginary but marvelous virtues of plants. Cæsalpinus sought successfully to transfer it from the realm of magic to that of science. He proposed the basis of classification upon which the whole system of Linnæus rests, namely, the distinction of plants in their parts of fructification. He even, to considerable extent, carried out the principle of the system practically, and defined many classes and orders as they remain in the Linnæan arrangement. He lived quietly to an old age at Rome, submitting all his speculations to the supremacy of the Church, and presenting in his life an example of every virtue.

Cæsar, the name of a patrician family of the Julian gens, tracing its origin to Julius, the son of Æneas. The first member of the family who occurs in history with the surname of Cæsar was Sextus Julius Cæsar, prætor, 208 B.C. Cæsar was the family name of the first five Roman emperors. With Nero the imperial family became extinct (68 A.D.), and Cæsar became merely a title of dignity. The emperor, who bore the title of Augustus, appointed his successor, with the title of Cæsar. On medals and monuments we find the title Cæsar preceding the name of the emperor, as "Imp. Cæsar Nerva Trajanus Augustus," and following that of the designated successor, as "Marc. Aurel. Antonin. Cæsar." In the lower Greek empire, a new dignity of Sebastocrator was conferred, and that of Cæsar became the third rank in the state. From Cæsar are derived the German "kaiser" and the Russian "czar."

Cæsar, Gaius Julius, Roman general, statesman, and historian: b. 10 July 100 B.C.; d. Rome, 15 March 44 B.C. He was the son of the prætor Caius Julius Cæsar, and from his earliest boyhood displayed extraordinary talents. He had a penetrating intellect, a remarkably strong memory, and a lively imagination; was indefatigable in business, and able, as we are told by Pliny, to read, write, hear, and dictate at the same time, from four to seven different letters. When the party of Marius, the uncle of Cæsar by marriage with his aunt, Julia, gained the ascendancy in Rome, Cinna, the friend of Marius, gave his daughter Cornelia in marriage to Cæsar, with the view thereby to establish his own power more firmly. Cæsar, who was already married, divorced his wife Cosutia to marry Cornelia, which provoked the anger of Sulla, who ordered him to put away Cornelia. Pompey and M. Piso were also ordered to put away their wives, and obeyed, but Cæsar resisted and was proscribed, and obliged to take refuge in the Sabine territory, being deprived of his wife, his fortune, and the priest-

hood which he had held from the age of 13. His friends obtained his pardon with difficulty, the dictator observing that "in that boy there were many Mariuses." Cæsar now withdrew from Rome, and went to Asia, serving his first campaign under M. Minucius Thermus, the prætor in Asia, who intrusted him with the command of the fleet which was to blockade Mitylene. In the execution of this trust Cæsar distinguished himself highly, and on the death of Sulla returned to Rome, distinguished himself as an orator in his accusations against Dolabella and other causes which he prosecuted, and used every means to increase his popularity. He afterward visited Rhodes, and placed himself under the instruction of Apollonius, to fit himself for speaking at the bar. On the way he was taken by pirates, and compelled to pay 50 talents for his release. To revenge himself, he fitted out some vessels at Miletus, overtook the pirates, made the greater number of them prisoners, and had them crucified before Pergamus. He now returned to Rome, entered into alliance with Pompey, and became military tribune, quæstor, and ædile. At the same time he had the address to win the favor of the people by affability, splendid entertainments, and public shows; and, trusting to his popularity, ventured to erect again the statues and trophies of Marius, who was hated by the senate and the patricians. He was accused of taking part in the conspiracies of Catiline, but no substantial proof has been given in support of the accusation, which was unlikely, as Cæsar had easier means of acquiring power. He defended the conspirators, who were arrested, and Cato strongly opposed him, so that he was obliged to quit the rostrum, and even his life was endangered. In the year 62 B.C. Cæsar was prætor. He had already, 63 B.C., been chosen *pontifex maximus*. On the expiry of his prætorship he obtained the government of Further Spain. His profuse expenditure in courting popularity had involved him deeply in debt. His creditors refusing to let him depart, Crassus became his security for the enormous sum of 830 talents. It was on his journey to Spain that he expressed, on seeing a miserable village, the well-known sentiment, that "he would rather be first there than second at Rome." In Spain he made several conquests, and returned to Rome with money enough to pay off his debts.

He now endeavored to reconcile Pompey and Crassus, whose enmity by throwing the influence of the latter into the aristocratic party would have interfered with the ambitious designs which Cæsar and Pompey had formed. He succeeded in his design, and all three agreed to divide the sovereign power between them. This was the first triumvirate in Roman history (60 B.C.). Cæsar then became consul with M. Calpurnius Bibulus, confirmed the measures of Pompey, and procured the passing of a law in opposition to the senate and his colleagues to distribute certain lands among the poor citizens. This brought him into the highest favor with the people. With Pompey he formed a still more intimate connection by giving him his daughter Julia in marriage, and gained the favor of the equestrian order by remitting a third part of their taxes. When the year of his consulship had expired, Cæsar obtained the government of Gaul for five years, with the command of four legions. After his marriage with the

accomplished Calpurnia he repaired to Gaul (58 B.C.), compelled the Helvetii, who had invaded that province, to retreat to their native country, subdued Ariovistus, who, at the head of a German tribe, had attempted to settle in the country of the Ædui, and conquered the Belgæ. In nine years he reduced all Gaul, crossed the Rhine twice (55 and 53 B.C.), and twice passed over to Britain (55 and 54 B.C.), defeated the gallant natives of this island in several battles, and compelled them to give him hostages. A rising of the Gauls under Vercingetorix was not put down without difficulty, but the country was latterly reduced to quietness, and was ruled by the conqueror with policy and kindness. The senate had continued his government in Gaul for another period of five years, while Pompey was to have the command of Spain, and Crassus that of Syria, Egypt, and Macedonia for five years also. But the death of Crassus in his campaign against the Parthians dissolved the triumvirate; and the death of Julia, which took place about the same time, cooled the friendship between Cæsar and Pompey—each intent upon his own aggrandisement.

Meanwhile the power and authority of Pompey had been constantly increasing. Cæsar, too, strove to strengthen and enlarge his own party in the capital. Pompey now lent his influence to the aristocratic party, and persuaded the Senate to pass a decree, by which Cæsar was to leave his army and resign his government of Gaul. He declared himself ready to obey if Pompey would do the same. Hereupon the senate ordered that Cæsar should resign his offices and command within a certain time, or be proclaimed an enemy to the state, and appointed Pompey general of the army of the republic. Upon this Cæsar urged his soldiers to defend the honor of their leader, led his faithful veterans across the Rubicon, a small stream then regarded as separating Italy from Gaul (49 B.C.), and made himself master of the peninsula without striking a blow. Pompey, destitute of troops to meet him, had left the city with the consuls, senators, and magistrates. Cæsar then levied an army with the treasures of the state, and hastened into Spain, which he reduced to submission without coming to a pitched battle with Pompey's generals. After conquering Massilia, now Marseilles, he returned to Rome, where he had already been appointed dictator. He was also chosen consul for the following year by the people. Pompey, who had retired from Italy, had now collected a considerable army, and his rival hastened to Epirus with seven legions to meet him. But the vessels which were intended to transport the rest of his troops were captured by Pompey's fleet, and Cæsar was for a time in a somewhat critical position. He soon, however, received the expected reinforcements, and advanced against his antagonist. Pompey declined coming to an engagement, but at last, being surrounded in his camp, was forced to take a decisive step in order to break through the enemy's line. This measure was successful, and Cæsar retreated to Pharsalia, where, in a bloody but decisive engagement (48 B.C.), he gained the victory over forces much superior in numbers. Pompey fled to Egypt, to raise a new army. As his party was only weakened, but not destroyed, Cæsar hastened after him, passed over the Hellespont, where Cassius surrendered to him with his fleet,

CÆSAR

and then went to Egypt. Here he received intelligence of the murder of Pompey. He shed tears at the tragical end of his rival, gave his body honorable burial, and loaded his followers with favors, by which many of them were won to embrace his cause. In Egypt he became involved in a war owing to his interference in a dispute regarding the respective claims of Cleopatra and her brother Ptolemy. Cleopatra became by him the mother of a son. Pharnaces, king of Pontus, a son of Mithridates the Great, having attempted to recover the territories of his father in Asia, Cæsar marched against him, pardoned King Deiotarus, an adherent of Pompey, on his way, and finished the war so speedily, that he announced his success to his friends in the famous words, *Veni, vidi, vici*.

Returning to Rome he granted an amnesty to all the followers of Pompey, and gained by his clemency the universal love of the people. When his dictatorship had expired he caused himself to be chosen dictator and consul again, and without changing the ancient forms of government ruled with almost unlimited power. In Africa, however, the Pompeian party had gathered under the standard of Cato and other generals. Cæsar passed over with an army, and fought several battles with various success, till the victory of Thapsus (46 B.C.) decided the contest in his favor. Cato, who was in Utica, and saw no hope of making head against the victor, stabbed himself, and the city surrendered. Cæsar then made Mauritania and Numidia Roman provinces, and gave orders for the rebuilding of Carthage and Corinth. This was accomplished in a year. In Rome he was received with the most striking marks of respect. The term of his dictatorship was prolonged to 10 years, the office of *præfectus morum* (supervisor of morals) conferred on him, and a public thanksgiving of 40 days was decreed in his honor. In a speech to the people he declared his resolution to use his power for the good of the state; and put an end to the apprehensions which some still entertained, by the pardon of his most open and bitter enemies. He now celebrated the four triumphs which had been decreed him over Gaul, Egypt, Pontus, and Africa, and which were among the most magnificent ever witnessed in Rome. Gifts of corn and money were lavishly bestowed upon the people and the soldiers, and shows and entertainments of all kinds were provided for the public. Measures were passed for the removal of evils and for various beneficial ends, and among other things Cæsar carried out the reformation of the calendar. During these peaceful occupations the sons of Pompey had collected new forces in Spain, so that Cæsar took the field in person against them. The parties came to a general engagement at Munda. A fortunate accident decided the battle in favor of Cæsar, after victory had been for a whole day doubtful. In seven months Spain was conquered, and Cæsar entered Rome in triumph. He was now made perpetual dictator, received for life the title of *imperator*, with full powers of sovereignty, and was also declared *præfectus morum* for life. He received the honorary title of "Father of his country," statues of him were placed in the temples, and divine honors were decreed him; and as a further honor the month hitherto called Quintilis was henceforth to be known as Julius (July).

The number of senators he increased from 300 to 900, and many of his supporters thus found admission. By increasing the numbers of the public magistrates others of them were in like manner rewarded. But enemies were at work forming plots against his life—some from mistaken notions of patriotism, others inspired rather by malice and envy. Cæsar's desire for the title of king gave some foundation for feelings of the former class. On one occasion, at a public festival, Mark Antony offered him a royal diadem. He refused it, however, and his refusal drew shouts of applause from the people. Cæsar, having no suspicion of the danger which threatened him, was forming new projects. He resolved to subdue the Parthians, and his friends gave out that according to the Sibylline books the Parthians could be conquered only by a king, and therefore proposed that Cæsar should retain the title of dictator with regard to Italy, but should be saluted with that of king in all the conquered countries. For this purpose a meeting of the senate was appointed for the 15th (the *ides*) of March, and this was the day fixed on by the conspirators for the execution of the plot. Foremost among them were Brutus and Cassius, both of whom had received favors from Cæsar. It had been arranged that Tillius Cimber should entreat a pardon for his brother, and when doing so was to tear the mantle from Cæsar's shoulders as the signal for their rushing upon him with their daggers. All was done as they had planned. Casca's dagger first pierced him in the neck. Scarcely had Cæsar turned, and uttered the words, "Accursed Casca, what doest thou?" when the conspirators rushed upon him from all sides. He defended himself, however, for a little. But when he descried Brutus among the conspirators, he exclaimed, "And thou, too, Brutus?" covered his face with his mantle, and fell, pierced with 23 wounds, at the foot of Pompey's statue. Thus died "the foremost man of all this world," 44 B.C., in the 56th year of his age. He was great as a statesman, a general, an orator, a historian, and an architect and engineer, and his assassination was brought about more by jealousy and envy than by real patriotism. Of his writings, we still possess the history of his wars with the Gauls in the commentaries 'De Bello Gallico,' and with Pompey in the 'De Bello Civili,' written in a simple, noble style. They have been frequently edited and annotated, and there are also numerous translations in various languages. Consult: Napoleon III., 'Histoire de Jules César' (1865-6); Delorme 'César et ses contemporains' (1868); Froude, 'Cæsar' (1878); Dodge, 'Cæsar' (1892); Fowler, 'Julius Cæsar and the Foundation of the Roman Imperial System' (1892); Holmes, 'Cæsar's Conquest of Gaul' (1899).

Cæsar, Sir Julius, English judge: b. Tottenham, 1558; d. 18 April 1636. He was the son of Cesare Adelmare, physician to Queen Mary. He was called to the bar in 1580; was appointed judge of the Admiralty Court in 1584; chancellor of the exchequer in 1606; and master of the rolls in 1614. He sat in six parliaments and was knighted in 1603. The close friend of Whitgift, and afterward of Bacon, he has left a higher reputation for superiority to bribery than for legal acumen, and his lavish bounty to

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all beggars is related to have rendered the loan of his coach, so well known to this fraternity, an expensive favor for his friends. He wrote two treatises on the 'Court of Requests' and on the 'Privy Council,' and a multitude of miscellaneous papers.

Cæsarea, ses-ā-rē'a, the ancient name of many cities: (1) CÆSAREA PHILIPPI, or PANEAS, named after Philip, tetrarch of Galilee, son of Herod the Great, who founded it in 3-2 B.C., near the source of the Jordan. It is mentioned twice in the Gospels. On its site is the small modern village of Banias. (2) CÆSAREA PALESTINÆ or STRATONIS, on the shores of the Mediterranean, about 55 miles northwest from Jerusalem. It was built with great magnificence by Herod the Great, and became the metropolis of Palestine, and the seat of the Roman proconsul, as well as a busy seaport. It was the place where Herod Agrippa was smitten by the angel (Acts xii: 20-23), where Cornelius the centurian resided (x.), and St. Paul was imprisoned two years (xxiii.-xxv.). It was a place of some importance during the Crusades, but is now a scene of ruin and of utter desolation. Eusebius was bishop of Cæsarea. (3) The ancient capital of Cappadocia in Asia Minor, originally called Mazaca, and now Kaisarieh. It is situated in the southeast of the vilayet of Angora, at the foot of the Erjish Dag, about 160 miles to the southeast of the town of Angora. It was once supposed to contain 400,000 inhabitants. It has now about 70,000 inhabitants, and its position makes it a place of considerable trade. The manufacture of carpets, though of quite recent introduction, is of some importance. Foreign goods are received by way of the railway from Angora to Constantinople. The name Cæsarea dates from the time of Tiberius, and under Valerian the city was captured by Sapor, when a large number of its inhabitants were slain.

Cæsarean Operation, a surgical operation, which consists in delivering a child by means of an incision made through the walls of the abdomen and womb. There are three cases in which this may be necessary: first, when the child is alive and the mother dead, either in labor or in the last two months of pregnancy; second, when the child is dead, but cannot be delivered in the usual way on account of the deformity of the mother or the disproportionate size of the child; and third, when both mother and child are living, but delivery cannot take place from the same causes as in the second case. In many instances both mother and child have survived this critical operation; and cases are known in which it has been successfully performed by the mother herself. The etymology of the name is doubtless from the Latin verb *cædere*, to cut; though a popular myth attributes it to Julius Cæsar, who, according to Pliny, was brought into the world in this manner. The operation would therefore appear to have been known from ancient times.

Cæsa'riion, the son of Julius Cæsar and Cleopatra, put to death by order of Augustus.

Cæsa'rius, Saint, of Arles, French prelate of the 6th century, consecrated Bishop of Arles in 502. Before the general adoption by monastic orders of the Rule of Saint Benedict his *Regula Duac* formed a standard of discipline much esteemed by the founders of orders.

Cæsarius of Nazian'zus, Christian scholar of the 4th century. From Alexandria, where his education was received, he went to Constantinople and rose to distinction as a mathematician and physicist. In the Latin editions of Saint Gregory are four dialogues ascribed to him, and he is also credited with a work styled 'Contra Gentes.'

Cæsar's Commentaries. This great work contains the narrative of Cæsar's military operations in Gaul, Germany, and Britain. It was given to the world in the year 51 B.C. Every victory won by Cæsar had only served to increase the alarm and hostility of his enemies at Rome, and doubt and suspicion were beginning to spread among the plebeians, on whom he chiefly relied for help in carrying out his designs. When public opinion was evidently taking the side of the Gauls and Germans the time had come for Cæsar to act on public opinion. Hence the 'Commentaries,' a hasty compilation made from notes jotted down in his tent or during a journey. As to its truthfulness we cannot decide absolutely, the Gauls not having written *their* commentaries. But if Cæsar sinned in this respect, it was probably by omission, not by commission. Things the Romans might not like he does not mention: the sole aim of the book is to gain their suffrages. There is no allusion to the enormous fortune Cæsar acquired by plunder. On the other hand, he speaks of his cruelties—for instance, the killing in cold blood of 20,000 or 100,000 prisoners—with a calmness that to us is horrible, but which the Romans would deem natural and proper.

Cæsars, The Era of, also known as the Spanish Era, a period of time reckoned from 1 Jan. 38 B.C., being the year following the conquest of Spain by Augustus. It was much used in Africa, Spain, and the south of France; but by a synod held in 1180 its use was abolished in all the churches dependent on Barcelona. Pedro IV. of Aragon abolished the use of it in his dominions in 1350. John of Castile did the same in 1383. It was used in Portugal till 1415, if not till 1422. The months and days of this era are identical with the Julian calendar, and to turn the time into that of our era, subtract 38 from the year; but if before the Christian era, subtract 39.

Cæsium, sē'zī-ūm, a metallic element discovered in 1860 by Bunsen and Kirchhoff, in the form of the chloride, in a mineral spring at Durkheim, Bavaria. The metal is widely disseminated, but is seldom found in any considerable quantity. It never occurs in the metallic state, but usually as the chloride or oxide, and commonly associated with the rare element rubidium. Its most important source is the mineral pollucite (q.v.), or pollux, which is found on the island of Elba and in the vicinity of Hebron, Me., and which contains as much as 36 per cent of cæsium oxide, with no rubidium. Cæsium forms stable salts, and strongly resembles potassium in its chemical properties. It may be separated from this metal, however, by taking advantage of the fact that cæsium platinochloride is much less soluble in water than the corresponding potassium compound. Metallic cæsium cannot be obtained by reducing the oxide with carbon, but is best prepared by the electrolysis of a fused mixture of the cyan-

CÆSTUS — CAGE-BIRDS

ides of cæsium and barium, using aluminum electrodes. It is a silvery white metal, quite soft and ductile, and oxidizing rapidly upon exposure to the air. It also decomposes water with the production of sufficient heat to ignite the liberated hydrogen. Cæsium has a specific gravity of 1.88, and melts at about 80° F. Its chemical symbol is Cs, and its atomic weight is 133 (O=16). Its oxalate and nitrate are used to a limited extent in medicine. The spectrum of cæsium is characterized by two blue lines, from which circumstance the element takes its name (*cæsius*, bluish-gray). It is readily recognized by the spectroscope, and was the first element discovered by that instrument.

Cæstus. See CESTUS.

Cæsura, se-zû'ra (Lat., literally a cutting), in verse, the separation of the last syllable of any word from those which precede it, and the carrying it forward into another foot. The term originally belongs to classical verse, in which the cæsura renders the syllable on which it falls long (if not otherwise so), and is accompanied by a slight pause, hence called the cæsural pause, as in the following line:

Ille latus niveum molli fulvus hyacintho.

See RHYTHM, VERSE.

Caf, kaf, or **Kaf**, a fabled mountain of the Mohammedans which encircles the whole earth. It is the home of giants and fairies, and rests upon the sacred stone Sakhr al, one grain of which gives miraculous powers to its possessor. This stone is of an emerald color, and its reflected light is the cause of the tints of the sky.

Café, kâ-fâ, a coffee-house, enlarged by American usage to include restaurants of all descriptions.

Caffarelli, François Marie Auguste, frân-swa ma-rê ô-gust kaf-fa-rêl'lê, French general: b. Falga, Haute-Garonne, 7 Oct. 1766; d. 23 Jan. 1849. At the beginning of the revolution he was employed in the Sardinian army, but joined the army of the republic as a simple dragoon. In 1804 he was charged with the mission to Rome to induce the Pope to come to Paris to perform the ceremony of Napoleon's coronation, and on his return was made governor of the Tuileries. He was wounded at Austerlitz, accompanied Prince Eugene in Italy, and took part in the war in Spain. In 1814 he was chosen by Napoleon to conduct the empress and their son from Paris to Vienna. He retired from public life after the battle of Waterloo.

Caffarelli, Gaetano Majorano, gâ-â-tâ-nô ma-yô-ra'nô, Italian vocalist: b. Province of Bari, Italy, 16 April 1703; d. Naples, 30 April 1783. As a boy he was considered the finest soprano of his time, his only possible rival in later years being the famous Farinelli.

Caffarelli du Falga, Louis Marie Joseph, loo-ê mâ-rê zhô-zêf kaf-fa-rêl'lê dû fal-gâ, French general: b. Falga, 13 Feb. 1756; d. Syria, 27 April 1799. He protested against the right of the national assembly to dethrone the king, and was dismissed from the army and imprisoned. Being released and reinstated, he distinguished himself in the army of the Rhine, under Jourdan. He accompanied the expedition of Napoleon to Egypt.

Caffeine, kâffê-in, an alkaloid occurring in the coffee bean, and having the formula C₈H₁₀N₄O₂. It is believed to be identical with the alkaloid theine, which occurs in tea, and also with guaranine (the alkaloid of guarana); and it is present in small amounts in cocoa. It may be prepared by adding basic acetate of lead to a strong decoction of coffee or tea until the tannin that is present has all been precipitated, removing excess of lead by a stream of sulphuretted hydrogen, and then evaporating the filtrate until the caffeine crystallizes out. When prepared in this manner caffeine consists of a mass of silky needles which contain more or less water. It is but slightly soluble in water, alcohol, or ether. It has a bitter taste, and although it acts as a weak base its salts are decomposed by water. See also COFFEE.

Caffery, Donelson, American lawyer: b. Saint Mary Parish, La., 10 Sept. 1835. He was educated at Saint Mary's College, Md., studied law and was admitted to the bar. He served in the Confederate army, 1861-5, was State senator in 1892, and United States senator, 1893-1901. From 1896 his political affiliations have been with the Gold Democrats.

Caffi, Ippolito, îp-pô-lê'tô kâff'fê, Italian artist: b. Bulluno, 1814; d. near Lissa, 20 July 1866. He studied in Venice and excelled in matters of perspective and effects of light. Among his chief works are 'Isthmus of Suez'; and 'Carnival Scene on the Piazzetta, Venice' (1855). He was killed on the Italian battleship *Re d'Italia* in a naval battle off Lissa, being present on that occasion with the design of painting a picture of the engagement.

Caffraria. See KAFFRARIA.

Caffyn, Kathleen Mannington (HUNT) ("IOTA"), English novelist: b. Waterloo House, County Tipperary, Ireland. She was trained as a hospital nurse, was married to Mannington Caffyn, a surgeon and author, and after his death began novel writing under the pseudonym of "Iota." Her first book, 'A Yellow Aster' (1894), attracted much attention. It is a "problem novel" and has been followed by 'Children of Circumstances' (1895); 'A Comedy in Spasms'; 'A Quaker Grandmother' (1896); 'Poor Max' (1898); 'Anne Mauleverer' (1899); 'The Minx' (1900); 'The Happiness of Jill' (1901).

Caftan, kâft'an, the national garment of the Turks, in the form of a loose gown, generally white, with pale-yellow flowers. It is made of woolen or silk stuff, and sometimes lined with costly fur.

Cagayan, kâ-ga-yân', an island of the Philippine group; the largest of six small islets, known as the Cagayan-Sulu group. It is five miles wide and eight miles long. Pop. (1900) 3,500. There are mountains attaining a height of 1,100 feet. The chief products are tobacco and sugar. There are pearl and shell fisheries. Cagayan was sold by Spain to the United States, with Cibitu, in 1900, upon payment of \$100,000, having been inadvertently excluded from the terms of the treaty of peace.

Cage-birds, birds kept in cages for the benefit or enjoyment afforded by their powers of song, beauty of plumage, ability to talk, or companionship. They have been so kept by

human beings ever since prehistoric times. The first essential for the maintenance of birds in captivity is a cage as large as possible, and as nearly like the bird's original habitat as circumstances permit. Cleanliness is a prime necessity, and the bird should be given a constant fresh supply of water for bathing and drinking purposes, and as much fresh air and light as possible, always, however, avoiding draughts and the sun's direct rays. The food and necessary attention bestowed on the bird vary according to the species.

Birds are captured by means of birdlime or a falling net, but many are taken from their nests when young, and so tamed, or are bred solely for market purposes. An important trade throughout Europe is the rearing of cage-birds, especially German canaries. The best-known songster, and probably the most popular cage-bird, is the common canary (q.v.), originally a native of the Canary Islands. It is typical of captive birds generally, in the marked change produced by captivity and selective breeding, in coloring and size, from that in its original wild state. Other widely known and popular cage-birds are the nightingale, goldfinch, cardinal, mocking-bird, bullfinch, the Indian bulbul, several European thrushes, and others, all of which are fine singers. Among the birds kept because of their beauty are the parakeets, love-birds, cockatoos, macaws, the whydah-bird, the painted finches, and others. Those imitating human speech are not so plentiful, consisting chiefly of the parrot, of which there are several species, and the starlings, especially the English species, and the Indian mina-bird (qq.v.). Owing to the change of climate, and especially the cold, nine tenths of the African parrots transported to Europe or North America die before learning to speak. It is advisable, therefore, to purchase such birds in the spring, thus giving them a chance to become gradually acclimated.

In the case of all cage-birds most particular attention should be paid to their food, and over-feeding must be especially guarded against. Frequently ailments can be greatly benefited by a fresh supply of food given in smaller quantities. Insectivorous birds are most troublesome to care for in regard to food, as their diet is less easily obtained. In case of inability to procure the accustomed food, finely chopped meat should be substituted, and a reasonable quantity of spiders is always beneficial. The universal and most acceptable food to nearly all birds, however, is canary-seed, with which hemp, rape, or oats may frequently be mixed to advantage. Seed-eating birds should be given such fresh vegetable matter as soft green leaves, chickweed, or lettuce, at regular intervals. Sugar in small quantities is also beneficial, but acid fruits of all kinds should be avoided. A prime necessity in the rearing of cage-birds is something on which the bird may sharpen its bill. This is most easily supplied in the form of sandpaper, or, better, cuttle-fish bone, which is essential to the health of breeding birds. *A bird's nails are apt to grow so long as to become troublesome to it, but in clipping them care should be taken to use a sharp pair of scissors, avoiding a possible injury to the foot by twisting.* In case of illness due to overfeeding, a drop of castor oil may prove beneficial, especially if it is accompanied by a change of surroundings, quiet, and a simpler diet for a time.

Consult: Bechstein, 'Cage and Chamber Birds'; and Greene, 'Notes on Cage Birds.'

Cagliari, Paolo, pà'ò-là, kal-yà'rē. See VERONESE, PAOLO.

Cagliari, käl-yà'rē, Sardinia, the capital of the island situated on a hill slope near the south coast. It consists of four parts: (1) the Castle or old town; (2) the Marina; (3) Estem-pache; (4) the Villa Nuova or new town. It is fortified, and is the residence of the viceroy and of an archbishop, and the seat of a university founded in 1596, and revived and remodeled in 1765. Cagliari has some manufactures, and is the chief emporium of the Sardinian trade. There are dockyards and a spacious and safe harbor. The "Castle" contains some important buildings, including palaces of the nobility. The cathedral, partly faced with marble, was completed in 1312, but afterward modernized. There are some interesting remains of Roman times, including an amphitheatre and ancient dwelling-houses. Cagliari was the residence of the kings of Sardinia from 1798 to 1814. It is connected by railway with the most important Sardinian towns. Pop. (1902) 55,300.

Cagliostro, Allesandro, al-lēs-àn'drō kal-yōs'trō (COUNT OF) (real name *Giuseppe Balsamo*), Italian charlatan: b. Palermo, 8 June 1743; d. St. Leon, Italy, 26 Aug. 1795. He entered the order of the Brothers of Mercy, where he found an opportunity to cultivate his talents for medical science, by which he afterward distinguished himself. But as he showed at the same time a great love of dissipation, he was compelled to separate from the order. He returned to Palermo, where, among other tricks, he deceived some credulous persons by his pretended skill in magic and the finding of hidden treasures. He also showed himself adroit in counterfeiting handwriting, and attempted to get possession of a contested estate by means of a forged document, but was discovered and was obliged to flee. He now determined to go to Rome, and in his journey through Calabria became acquainted with Lorenza Felciani, daughter of a belt-maker, who appeared to him intended by fortune to assist his designs. He formed an intimacy with her, and they began their travels, in which he assumed the character of a man of rank, first appearing under the name of the Marquis Pellegrini, and finally under that of the Count Cagliostro. He traveled through many countries of Europe, stopped in the capital cities, and by his chemical mixtures, his tricks, and by the amours of his companion, gained considerable sums. He knew how to cheat with great ingenuity, and was always fortunate enough to preserve himself by an early flight, if men's eyes began to be opened, or waking justice threatened him with imprisonment. The discovery of the philosopher's stone, the preparation of a precious elixir vitæ, etc., were the pretenses by means of which he extracted considerable sums from credulous people. Many had recourse to his assistance, not indeed to be initiated into the mysteries of magic, but to purchase at a high rate different kinds of medicine, one of which was the water of beauty. This profitable business employed him many years; but his trade in medicine began to grow less lucrative, and he determined to seek his fortune as the founder of a new and secret sect. In pursuance of this plan he passed

himself off during his second residence in London for a freemason, and played the part of a magician and worker of miracles, in which character he drew upon himself the eyes of all the enthusiasts in Europe. The Countess Cagliostro, on her part, did not remain idle. She was the first and most perfect scholar of her husband, and ably played the part of a priestess to this new order. His plan for reviving an old Egyptian order, the founders of which he declared to be Enoch and Elias, contained a mass of absurdities, but his pretensions to supernatural power, the mystery with which his doctrines were enveloped, his pretended ability to work miracles, his healing the sick without pay, with the greatest appearance of generosity, and the belief that, as the Great Kophta (this name he had taken as the restorer of Egyptian masonry), he could reveal the secrets of futurity, gained him many friends and supporters. Cagliostro again traveled through Europe, and attracted great attention in Mittau, Strasburg, Lyons, and Paris. While in this last city (1785) he has the misfortune to be implicated in the scandalous affair of the necklace, and was banished the country as a confidant of Cardinal Rohan. He now returned to London, and sent many epistles to his followers, wherein he bitterly complained of the injury he had received in France, and painted the French court in the blackest colors. From London, where he could not long remain, he went to Basel and other cities in that quarter. But at length, listening to the repeated entreaties of his wife and other friends, he returned (1789) to Rome. Here he busied himself about freemasonry; but being discovered and committed to the Castle of St. Angelo, he was condemned by a decree of the Pope to imprisonment for life as a freemason, an arch heretic, and a very dangerous foe to religion.

Cagnacci, kǎn-yǎ'chē. See CANLASSI.

Cagnola, Luigi, loo-ē'jē kǎn-yō'lā, MARCHESE, an Italian architect: b. Milan, 9 June 1762; d. Inveriga, 14 Aug. 1833. He was a member of the State Council, and was much engaged in political affairs. His most celebrated works are the Arco della Pace, "Arch of Peace," commenced in 1807 and finished in 1837; the Porta di Marengo, subsequently called Porta di Ticino (both built by order of Napoleon), at Milan; the Campanile, at Ugnano, completed in 1829, and the Mausoleum for the Metternich family.

Cagnoli, kǎn-yō'lē, Antonio, Italian astronomer: b. Zante, Ionian Islands, 1743; d. Verona, Italy, 1816. He was attached in his youth to the Venetian embassy at Paris, where, after the year 1776, he showed more love for astronomy than for diplomacy. Having settled in Verona in 1786 he constructed an observatory in his own house, by his observations in which he enriched the science of astronomy with many discoveries. After the destruction of his observatory by the French (1798), who, however, compensated him for his loss, his instruments were transferred to the observatory of Brera in Milan, and he was appointed professor of astronomy in the military school at Modena. His best works are 'Notizie Astronomiche adate all' Uso comune' (1802); 'Trigonometria Piana e Sferica' (second edition, Bologna, 1804).

Cagots, kǎ-gō', a race or caste of men, living in the south of France in the region of the Pyrenees, regarded as pariahs or social outcasts. In former ages they were shut out from society as lepers, cursed as heretics, and abhorred as cannibals; their feet were bored with an iron, and they were forced to wear a piece of red cloth in the shape of a duck's foot on their clothes by way of distinction. The only trade they were allowed to follow was that of sawyers or carpenters. They had to enter the church by a special door, and had a special corner set apart for them with a holy-water vessel for themselves. Opinions are divided with regard to the origin of the Cagots, of whom there are now comparatively few. They have been considered by some to be remains of the Saracens conquered by Charles Martel. The most plausible conjecture is that which derives them from the Visigoths who established themselves in the south of France and in Spain in the 5th century. The origin of the name has been the subject of equal controversy. Among numerous derivations, is that from *canis* and *gothus*, "dogs of Goths." Others derive the name from a word simply meaning leper, and believe that the Cagots were originally lepers, who as such were expelled from the society of and intercourse with their fellowmen. Until the French Revolution the Cagots were not considered as citizens. Some remains of them, or of corresponding outcasts, are to be found under various names in different parts of France. Similar remains of pariah races are also found among the mountains of North Spain. See Michel, 'Histoire des Races Maudites de la France et de l'Espagne.'

Cahan, kǎ'hān, Abraham, Russo-American journalist and novelist: b. Vilna, Russia, 7 July 1860. He came to the United States in 1882 and has edited several Yiddish periodicals in New York. He has written 'Yekl, a Tale of the New York Ghetto'; 'Raphael Narizokh,' in Yiddish; 'The Chasm'; 'The Imported Bridegroom and Other Stories.'

Cahawba, ka-hô'ba, a river of Alabama, rises in Jefferson County, and after passing through a rich coal region, joins the Alabama at Cahawba, in Dallas County. It is navigable by small boats for 100 miles.

Cahens'lyism, a popular name given to a movement in the United States in 1891, among Roman Catholics speaking other languages than English, to have bishops or priests of their respective nationalities appointed over them. It took its name from Herr Cahensly, a layman, secretary of St. Raphael's Society for the protection of German Catholic immigrants to this country, on the supposition that he was the chief inspirer of the movement. On a visit to the United States in 1893 Herr Cahensly denied his connection with the scheme. It was vigorously opposed by most of the English-speaking prelates of the Roman Catholic Church in this country. It received no official sanction by the Vatican authorities, and, after considerable agitation in the Catholic and secular press, died out. As a matter of fact, owing to the large immigration of Roman Catholics speaking foreign tongues, priests of their respective nationalities are often appointed to administer to their spiritual needs. This is

especially notable in the instance of the Italians. To meet this necessity in the archdiocese of New York, the study of Italian is now made compulsory in its diocesan seminary for all candidates for the priesthood.

Cahors, ka-ör, France, (ancient CADURCUM), capital of the department of Lot, and on the river of that name, 60 miles north of Toulouse. It is nearly surrounded by the river, and communicates with the opposite shore by three bridges, one of which is ancient. Before the conquest of Gaul by Cæsar it was the capital of the Cadurci, and under the Romans, who gave it the name of Divona, it was adorned with a temple, theatre, baths, an immense aqueduct, and forum. Several Roman roads can still be traced in its vicinity. Among the principal edifices are the cathedral, an irregular structure, supposed to be partly Roman; an episcopal palace, now converted into the prefecture; three old churches; barracks; a theatre; and a lyceum or college. Cahors had formerly a university, which was united with that of Toulouse in 1751. It was founded in 1322 by Pope John XXII., a native of the town. The celebrated jurist Cujas was a professor, and Fénelon a student in it. To the latter an obelisk has been erected. The manufactures are insignificant; but a considerable trade is carried on in the red wine of the district, and in brandy. Coal is worked in the vicinity. Clément Marot, the poet, was born here. Cahors was given up to the English by the Treaty of Brétigny in 1360. It revolted, and returned to France in 1428. Pop. (1902) about 15,000.

Caiaphas, ka'ya-fas, the high-priest of the Jews at the time when the crucifixion took place. Previously, when the resurrection of Lazarus had spread dismay among the Jewish functionaries, it was Caiaphas who suggested the expediency of putting the Saviour to death, and when he was arrested in Gethsemane he was carried first to Annas, and then to Caiaphas, from whom he was transferred to the hands of the civil authority. Caiaphas was deposed, 35 A.D., and Jonathan, son of Annas, appointed in his stead.

Caibarien, kī-bā-re-ān', Cuba, a town of the province of Santa Clara, situated on the northern seacoast; it has sponge fisheries and some trade. Pop. about 8,000.

Caicos, kī'kōs, **Cayos**, or **The Keys** (from the Spanish *cayo*, a rock, shoal, or islet), one of the island groups comprehended under the general name of the Bahamas, belonging to Great Britain, consisting of six islands besides some uninhabited rocks; between lat. 21° and 22° N. and lon. 71° and 73° W. The largest, called the Great Key, is about 30 miles long. They are wooded and tolerably fertile, and at one time produced cotton, but at present the inhabitants are few in number, and mostly engaged in fishing and the preparation of salt. In 1873 the Turks Islands and the Caicos were united into a commissionership under the governor of Jamaica. Pop. 1,784.

Caillietet, Louis Paul, loo-ē pōl ka-yē-tā, French chemist: b. Châtillon-sur-Seine, 1832. He studied at the School of Mines in Chatillon and subsequently gave especial attention to original research. He was able to liquefy both oxygen and nitrogen in 1877 and was at once elected

corresponding member of the Académie des Sciences, becoming a full member in 1884. He was made an officer of the Legion of Honor in 1889.

Cailliaud, Frédéric, frā-dē-rīk ka-yō, French traveler: b. Nantes, France, 9 June 1787; d. there, 1 May 1869. In examining the mineral resources of Egypt, he rediscovered the ancient emerald mines of Jebel Zobara, near the Red Sea; and his report of a journey to Siwah, led to its annexation by Egypt in 1820. In 1821-2 he accompanied Ibrahim Pasha's expedition to the White Nile, and his 'Journey to Meroe' (1826-7), contained the first reliable information of that district. He also published 'Voyage à Oasis de Thebes' (1821). In 1827 he settled as conservator of the Natural History Museum at Nantes, where he died.

Caillie, René, rē-nā ka-yā, French traveler: b. Mauzé, Poitou, France, 19 Sept. 1799; d. Paris, 8 May 1838. He became an African traveler early in his career, obtaining his living by trading with the Moors, who taught him Arabic. On his travels he dressed in Arabic style and passed as an Egyptian. Having gone to Senegal he learned that the Geographical Society of Paris had offered a premium of 10,000 francs to the first traveler who should reach Timbuctoo. On 13 June 1827 he reached for the first time the shores of the Niger, which he crossed. He then traveled about 200 miles eastwardly over territories never visited before, arriving at Timé 3 August. Here he was detained by illness until 9 Jan. 1828, when he struck on a new road previously unknown to geographers, and reached Jenne on 11 March. Here he embarked for Timbuctoo, where he arrived about 11 April, after one month's sail on the Niger. After a short stay of a fortnight, and after a tedious and painful return passage through the desert, he reached Fez, 12 August, and from there returned to France. On his arrival at Toulon he was received with the utmost enthusiasm. He was the first European who ever returned from Timbuctoo, and who had achieved success, while expeditions supported by government had resulted in failure. A special prize of 10,000 francs was awarded to him by the Geographical Society, with the annual prize of 1,000 francs for the most important discovery. The order of the Legion of Honor was conferred upon him by the king, and he became, at the same time, the recipient of a salary in connection with an office, to which he was appointed in the Senegal service. Furthermore, a pension from the fund set apart for eminent literary and scientific men was decreed to him by the minister of the interior, and his 'Journal d'un voyage à Timbuctou et Jenné, dans l'Afrique centrale, etc.' with geographical data added by Jomard, was published at the expense of government, and appeared at the beginning of 1830 in three volumes.

Caïman. See CAYMAN.

Cain, the eldest son of Adam and Eve; the first murderer, who slew his brother Abel. For the biblical account of Cain and his descendants see Gen. iv.-vii. Modern biblical scholars assume that Genesis iv. is a composite of stories relating to several Cains. The posterity of Cain became extinct at the flood. Cain founded the first city, and his descendants were the first

CAIN — CAIRNES

inventors and promoters of the useful and agreeable arts. Josephus relates that he became the leader of a band of robbers, committed all sorts of licentiousness, corrupted the simplicity of primitive manners by his luxury, established the right of property by setting up landmarks, and was the inventor of weights and measures. A Gnostic sect of the second century were called "Cainites."

Cain, Auguste Nicolas, ô-güst nîk-ô-lä ka-än. French sculptor: b. Paris, 4 Nov. 1822; d. there, 7 Aug. 1894. He was in early life a carpenter, but subsequently studied under Guionnet and Rude, and devoted his attention chiefly to groups of animals. He received the bronze medal in the Great Exhibition of 1851, another medal in 1864, and a third at the Universal Exposition in 1867. Among noted works by him are 'Eagle Defending its Quarry' (1852); 'Combat Between Two Tigers' (1878); 'Rhinoceros Attacked by Tigers.'

Cain, Richard Harvey, American clergyman: b. Greenbrier County, Va., 12 April 1825; d. Washington, D. C., 18 Jan. 1887. He entered the ministry at an early age; was elected to the South Carolina constitutional convention in 1867, and to the State Senate in 1868; and was a member of Congress 1876-1880. He was made bishop in the African Methodist Episcopal Church and placed in charge of the churches in Louisiana and Texas, and later was transferred to the first Episcopal district of that church. While in Texas he organized Paul Quinn College in Waco.

Cain, William, American civil engineer: b. Hillsboro, N. C., 14 May 1847. He was graduated from the North Carolina Military Institute and has since been professor of mathematics and civil engineering in the University of North Carolina. He has published 'Theory of Voussoir, Solid and Braced Arches' (1874); 'Maximum Stresses in Framed Bridges' (1878); 'Solid and Braced Elastic Arches' (1879); 'Symbolic Algebra' (1884); 'Practical Designing of Retaining Walls' (1888).

Caine, Thomas Henry Hall, English novelist and dramatist: b. Runcorn, Cheshire, 14 May 1853. He received his education in the Isle of Man and at Liverpool, and qualified as an architect, but abandoned architecture in order to become a journalist. He lived in London with Dante Gabriel Rossetti from 1881 till the latter's death in 1882, and in that year appeared his 'Recollections of Rossetti'. He had previously published 'Richard III. and Macbeth' (1877), a critical work, and 'Sonnets of Three Centuries' (1882). In 1883 appeared his 'Cobwebs of Criticism,' a review of the contemporary critiques of Wordsworth, Shelley, Byron, Keats, and other poets; and in 1887 he contributed to the Great Writers series a 'Life of Coleridge.' His first novel was 'The Shadow of a Crime' (1885), followed next year by 'A Son of Hagar'; but 'The Deemster' (1887), since dramatised (as 'Ben-na-Chiree'), first brought him into prominent notice. His subsequent novels include 'The Bondman' (1890), 'The Scapegoat' (1891); 'The Prophet' (1892); 'The Manxman' (1894); 'The Christian' (1897); 'The Eternal City' (1901). Of 'The Christian' nearly 100,000 copies were sold in England, and as many more in the United States, within the first year after publication.

On both continents it provoked great discussion, the verdict in England being generally unfavorable to the motive of the book, while in the United States it was generally favorable. It was immediately translated into most of the languages of Europe, and provoked the same divided opinion everywhere. He has traveled in Morocco, Iceland, Russia, and North America, and acted in Canada as representative of the Society of Authors in negotiations concerning Canadian copyright. His most successful novels deal with Manx life, in the description of which he reveals intimate knowledge of his subject and considerable literary power.

Caique, kä'ek, a light boat or skiff much used in the Levant, and particularly in the Bosphorus.

Caird, kârd, Edward, Scottish philosopher: b. Greenock, 22 March 1835. He was educated in his native town and at the universities of Glasgow and Oxford; was a Fellow and tutor of Merton College, and was professor of moral philosophy at Glasgow from 1866 till 1893, the year of his appointment as master of Balliol College, Oxford, in which post he succeeded Prof. Jowett. He is author of 'Account of the Philosophy of Kant' (1878); 'Social Philosophy and Religion of Comte' (1885); 'Hegel' in Blackwood's Series of Philosophical Classics (1883); 'Critical Philosophy of Immanuel Kant' (1889); 'Essays on Literature and Philosophy' (1892); and 'The Evolution of Religion' (1893). He is a brother of John Caird (q.v.).

Caird, John, Scottish clergyman: b. Greenock, 15 Dec. 1820; d. London, 30 July 1898. He was educated at the Grammar School of Greenock, and at Glasgow University, where he took a high place both in arts and divinity. Having entered the ministry of the Church of Scotland, in 1845 he became minister of Newton-upon-Ayr, and two years later was transferred to Lady Yester's parish church, Edinburgh. Between that date and 1862, when he became professor of divinity in Glasgow University, he was minister of Errol, Perthshire (1849-57), and of Park Church, Glasgow (1857-62). In 1873 he was elected principal of his university, a position which he held till his resignation in 1898. He died before his resignation had taken effect. He published sermons (his sermon 'Religion in Common Life,' preached before the queen, had an immense circulation, and was described by Dean Stanley as the greatest sermon of the century); 'Introduction to the Philosophy of Religion' (1880); and 'Spinoza' (1888) in Blackwood's Philosophical Classics. In 1899 appeared 'The Fundamental Ideas of Christianity,' under the editorship of his brother, being the Gifford Lectures delivered in 1891-2 and 1895-6, accompanied by a memoir of the author.

Cairn, kârn (Gaelic *carn*), a name given to heaps of stones, common in Great Britain, particularly in Scotland and Wales, generally of a conical form. Some are evidently sepulchral, containing urns, stone chests, bones, etc. Others were erected to commemorate some remarkable event, and others appear to have been intended for religious rites. See TUMULI.

Cairnes, kârnz, John Elliot, British political economist: b. Castle Bellingham, County Louth, 26 Dec. 1823; d. London, 8 July 1875.

After an education at Kingstown and Chester he was for a time employed in his father's brewery at Grogheda, but ultimately went to Trinity College, Dublin. He was graduated in 1854, and two years afterward was appointed Whately professor of political economy at Dublin. His first series of lectures was published in 1857, under the title 'The Character and Logical Method of Political Economy.' In 1859 he was elected professor of political economy and jurisprudence in Queen's College, Galway, and seven years later was appointed to the corresponding chair in University College, London; but in 1872 the state of his health compelled him to give up active teaching. He had been called to the Irish bar in 1857, but he hardly ever practised. During the later years of his life he suffered much from the effects of an accident to his knee, which befell him while hunting in 1860, and for some time before his death was completely crippled. In 1862 he issued a work in defense of the northern States of America, entitled 'The Slave Power,' which had a very large circulation. The most important of his others works are 'Essays on Political Economy, Theoretical and Applied' (1873); and 'Some Leading Principles of Political Economy newly Expounded' (1874). He takes rank as one of the leading economists of the 19th century.

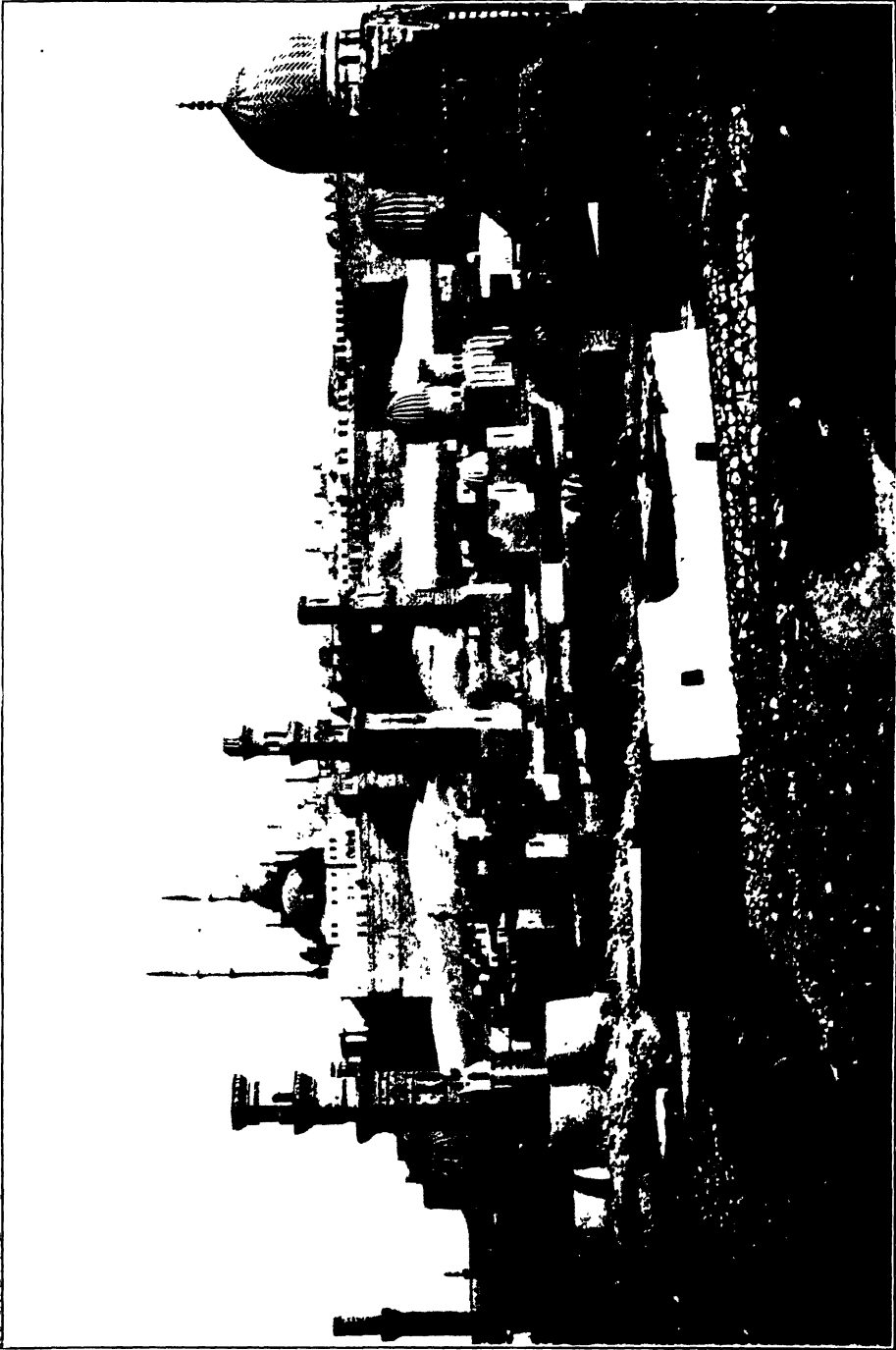
Cairnes, William Elliott, English army officer: d. London, 19 April 1902. He obtained a lieutenant's commission in 1884, and became a captain in 1890. He published 'The Absent-Minded War'; 'The Army from Within'; 'The Coming Waterloo'; and 'Lord Roberts as a Soldier in Peace and War.'

Cairngorm, *kärn-görm'* (that is, "blue cairn"), a mountain of Scotland belonging to the Grampian Hills, on the border of Banffshire and Inverness-shire, three miles north of Ben Macduh in Aberdeenshire. Its summit is 4,084 feet above the level of the sea, and its sides are clothed with pine forests. The group of mountains to which it belongs is known as the Cairngorm Mountains. It is particularly celebrated for the regular, brownish yellow crystals of quartz found on it and known as cairngorms. These are also found in many other places, and are much used for seals, brooches, etc. Specimens weighing a good many pounds are sometimes found.

Cairns, kárnz, Hugh MacCalmont (EARL), Irish lawyer and parliamentary debater: b. County Down, Ireland, 1819; d. Bournemouth, England, 2 April 1885. He was called to the bar at the Middle Temple in 1844, was returned to Parliament for Belfast in 1852, and quickly made his mark in the House by his fluency and readiness in debate. He became Queen's Counsel in 1856, in 1858 solicitor-general, and in 1866 attorney-general under Lord Derby. Later in the same year he was a judge of appeal, and in 1867 was created Baron Cairns. Under Disraeli's premiership he became Lord Chancellor in 1868, and again in 1874, and was created Viscount Garmoyle and Earl Cairns in 1878. For some years he led the Conservatives in the House of Lords with equal dexterity and vigor, and is ranked among the finest parliamentary orators of recent years.

Cairns, John, English theologian: b. Berwickshire, 23 Aug. 1818; d. Edinburgh, 14 March 1892. He was ordained at Berwick in 1845, where he remained till 1876, becoming also in 1867 professor of theology in the United Presbyterian Church, and principal in 1879. He was an eminent preacher and the author of the article 'Kant' in the 'Encyclopædia Britannica' (8th ed.); contributed to the new edition of Herzog's 'Real-encyclopædie'; and published the 'Life of John Brown, D.D.' (1860); and 'Unbelief in the 18th Century' (1881). See Cairns, 'Principal Cairns' (1903).

Cairo, *kīrō* (Arabic, *El Káhira*, "The Victorious," or *Masr el Káhira*), Egypt, capital of the country and largest town of Africa, situated on the right bank of the Nile, about seven miles above the point where it divides to form the two main branches of its delta. The town is built between the river-bank and the northwestern end of the hills known as Jebel Mokattam, on whose most advanced spur stands the citadel in a commanding position well above the rest of the city. During the last 40 years the town has lost much of its Oriental character, but the Arab quarters still present a maze of very narrow streets lined by curious buildings in endless variety of style. The houses are mostly built of yellow limestone, with flat roofs; and many of them have small gardens behind. In the more modern parts of the city the streets are broader, and many of them are lined by trees and lighted by gas. The European quarter, known as Ismailiyeh, forms the western part of modern Cairo, and its centre is the octagonal Ezbekiyeh Garden (20½ acres), with plants from many regions and with an artificial pond. Here, too, are many cafés, concert-halls, and other similar buildings. Among the more notable buildings of the European quarter are the consulates, the opera-house, open in winter, the Italian summer theatre, English and German churches, the ministerial offices, and the barracks. The chief business street of Cairo, known as Muski, runs east-southeastward from the neighborhood of the Ezbekiyeh, and the Boulevard Mehemet Ali extends from about the same place southeastward to the citadel. Cairo has more than 500 mosques, but many of them are wholly or partly in ruins. The finest of all is the Sultan Hasan Mosque, a truly noble building with a lofty minaret. Others worthy of mention are: that built in the 9th century by Ahmed ibn Tulûn in imitation of the one at Mecca; the Hakim Mosque, dating from the beginning of the 11th century; the Hosen Mosque of the son of Ali, Mohammed's son-in-law; the Sitti-Zeynab Mosque, named after a grandchild of the prophet; the Azhar Mosque, famous for its schools of theology, which are attended by Mohammedans from all parts of the world; and the Alabaster Mosque of the citadel, with the tomb of Mehemet Ali, the finest of the modern mosques. The tombs in the burying-grounds outside the city, many of them in the form of mosques, also deserve mention, especially those known as the tombs of the caliphs. The most important gate of the city is the Bab-en-Nasr, through which large numbers of pilgrims pass every year on their way to Mecca. The mosques contain valuable libraries, but the chief library of the city is the viceregal one, founded in 1870, and now con-



TOMBS OF THE MAMLUKS, CAIRO

CAIROLI — CAISSON DISEASE

taining about 60,000 volumes, largely in manuscript. The trade of Cairo is large and the bazaars and markets are numerous, there being special bazaars for gold and silver smiths, tapestry merchants, saddlers, armourers, shoemakers, etc. Beside the numerous Mohammedan places of worship Cairo contains English, French, German, Coptic, and other churches and Jewish synagogues, and there are European schools and hospitals. The Egyptian Institute, founded at Alexandria in 1859, is now located in Cairo.

The suburb of Bulak, in the northwest of the town, opposite the island of Bulak, forms the port of Cairo, and its narrow streets present a busy scene of Oriental life. The island of Bulak and the left bank of the Nile are reached by a great iron bridge, and there is also a railway and general traffic bridge below the island. To the southwest of the modern town and also on the Nile bank stands the suburb of Old Cairo or Masr el-Atika. On the left bank of the river, almost directly opposite Old Cairo, is the suburb of Gizeh. It has government buildings, a zoological garden, etc., but its chief attraction is the great Egyptological Museum formerly in Bulak, but removed here in 1889. From Gizeh a road and a tramway lead southwestward to the famous group of pyramids called the pyramids of Gizeh. On the island of Roda, between Gizeh and Old Cairo, the celebrated Nilometer still stands. Cairo enjoys a very mild climate, and is in consequence visited in winter by many Europeans suffering from chest and lung ailments. Many of these stay at Helwan, a small place about 14 miles south-southeast of the town. Cairo is in railway communication with Alexandria, Damietta, Suez, etc., and with Upper Egypt, and the Fresh-water Canal connects it with Ismailia and Suez. In 1896 electric tramways were introduced in the most important streets. Cairo is the residence of the Khedive, the seat of a Coptic and a Greek Orthodox patriarch, and it contains all the highest public offices of the country. El-Fostat, "The Tent," now Old Cairo, was founded by Amru, lieutenant of Caliph Omar, in 640 A.D. In 969, when the Fatimite dynasty gained possession of the country, the new city to the north was founded. Saladin surrounded it with walls of stone and built the citadel. He also constructed a wooden aqueduct from the Nile to the citadel, a work afterward replaced by the still existing aqueduct of stone. Cairo was taken by the French in 1798, and was occupied by the British in 1882, after the battle of Tel-el-Kebir. Pop. (1897) 570,062, including Fellahin, Copts, Turks, Arabs, and other Orientals, beside about 25,000 foreigners from the chief European countries, especially Italy, Greece, France, Austria, England, and Germany.

Cairo, Ill., city, port of entry and county-seat of Alexander County, situated at the junction of the Ohio and Mississippi rivers, 175 miles below St. Louis, on the Illinois Central and Cleveland, C., C., & St. L. R.R.'s. It has a large transit trade in agricultural products and lumber. A custom-house is located here and a United States marine hospital. Cairo was settled about 1837, but its growth was for many years impeded by frequent floods, until levees were built. The town was, during the Civil War, a depot for military supplies. Pop. (1900) 12,566.

Cairolì, Benedetto, bā-nā-dēt'tō kī'rō-lē, Italian statesman: b. Gropello, near Pavia, 28 Jan. 1825; d. Lago di Monte, near Naples, 8 Aug. 1889. He served in the war against Austria in 1848 and was an exile in Piedmont, 1851-9. In the latter year he again fought for the Italian cause and was at the siege of Palermo and other important military engagements. His preferences were in favor of a republic, but he accepted constitutional monarchy, and when Humbert I. became king Cairolì was made president of the Chamber, becoming prime minister in March 1878. While driving with the king, on 17 November of that year, Cairolì received a severe poniard wound intended for the king, who escaped with a slight injury. His ministry resigned in December 1878, but came again into power the next year, resigning finally in 1881. Cairolì was thenceforward conspicuous as a leader of what was known as the "historic left." See Lowell, 'Governments and Parties in Continental Europe' (1897).

Caisson, in civil engineering, a water-tight chest or casing, used in the construction of bridges, quays, etc., large enough to contain an entire pier, which is built in it; the caisson being sunk to the bed of the river. The pneumatic caisson has an air-chamber in which men may work at the bottom of the water, air being forced in to keep the water out, and the air-space being entered by what is called an air-lock. This form of caisson is used where the water is too deep to permit of the construction of a coffer-dam. The name is also applied to an air-tight structure which is sunk below a vessel by the admission of water, and raises the vessel when the water is pumped out; and to the boat-shaped gate used to close the entrance to a dry dock. (See Dock). In military language, the ammunition carriage attached to a battery of artillery.

Caisson Disease, or Compressed Air Disease, a disorder occurring among workers in compressed air, as in bridge-caissons. After working in an atmosphere of compressed air the return to normal pressure is brought about gradually in an anteroom, which is called an "air-lock." If this transfer takes place rapidly the symptoms may appear quite suddenly. The usual factors are high pressure, poor ventilation, and prolonged exposure. Old people, those addicted to alcohol, and those with organic disease are most susceptible. Slight transient symptoms, such as ringing of the ears and giddiness, are not uncommon; more severe symptoms are rare. When the disease is well marked we may have rupture of the ear-drum, nose-bleed, spitting of blood, pain in the stomach, vomiting, various neuralgic pains, paralysis—especially of the legs and bladder, incoherent speech, prostration, and loss of consciousness. The disease lasts from a few hours to several days, but the paralysis may persist for months. The fatal cases show congestion of the internal organs, especially the brain. Death may be sudden or occur in three or four days. When the symptoms come on suddenly the patient should be at once returned to the compressed air and given oxygen to breathe. A. H. Smith recommends ergot and morphine, with rest in bed, warmth, and stimulants. See also Allbutt, 'System of Medicine,' Vol. VII.

Caithness, kăth'nēs, Scotland, most northern county of the mainland; area, 686 square miles. The surface is generally level or undulating, and there are few hills of any height, except on the Sutherland border. Much of the surface is deep moss or peaty moor, but there is a fair proportion of fertile land in the eastern part. About one quarter of the whole surface is under crops and rotation grasses, or in permanent pasture. Of corn crops oats is by far the most important. Only a very small portion of the county is wooded. The coast is prevailingly bold and rocky, the chief headlands being Dunnet Head on the north coast, Duncansby Head at the northeast corner, Noss Head and the Ord on the east coast. The largest bays are Dunnet Bay on the north and Sinclair's Bay on the east, but Thurso Bay and Wick Bay are also noteworthy. There are many lakes, some of them very attractive. The largest is Loch Watten, near the centre of the county. Of the rivers only the Thurso, the Forss, and the Wick need be mentioned. Caithness is poor in metallic minerals, but excellent flagstones have been quarried for many years and form one of the chief exports of the county. Many of the inhabitants are engaged in fishing, and Wick is one of the chief centres of the Scottish herring-fishery. The manufactures are mainly subsidiary to its other industries. Wick, the county town, is a royal burgh, and Thurso is the only other town. The antiquities of Caithness are numerous, and include old castles, so-called Picts' houses, monoliths, etc. The county returns one member to Parliament, and Wick joins with Kirkwall, Tain, and other places in sending another representative. Pop. (1901) 33,859.

Caius, kă'yūs, the name of several persons mentioned in history. 1. A Roman general, son of Marcus Agrippa and Julia, the daughter of Augustus Cæsar, who lived in the 1st century before our era. He was adopted by Augustus, served under Tiberius in Germany, and was sent as proconsul against the Arabians, Armenians, and Parthians. He reduced Armenia and routed Tigranes. He was treacherously wounded at a private interview with an enemy, and sank early and much regretted under the effects. 2. A Christian theologian and bishop of the 3d century. He had a conference with Proculus, the leader of the Montanists, and in 210 was appointed a bishop with the commission of preaching to the heathen in foreign parts. He regarded the epistle of St. Paul to the Hebrews as apocryphal, and was the first who wrote against Cerinthus and the Millenarians. 3. CAIUS, SAINT, bishop of Rome, d. 21 April 296. He was a native of Dalmatia, and nephew of the emperor Diocletian. He succeeded Eutychianus 16 Dec. 283. At the time of the first persecution of the Christians by Diocletian he was forced to find safety in an obscure retreat.

Ca'ius, Doctor, the French physician in Shakespeare's comedy of 'Merry Wives of Windsor.' He is in love with Anne Page.

Caius, kēz, **John**, English physician, the founder of Caius College, Cambridge University: b. Norwich, 6 Oct. 1510; d. Cambridge, 29 July 1573. His name was Kaye or Key, which he Latinized into Caius. He took his degrees at Gonville Hall, Cambridge, and was chosen Fellow of his college. While at Cambridge he distinguished himself by various translations from

the classics. He spent some time in traveling on the Continent, studied medicine at Padua, under Montanus and Vesalius, and took his doctor's degree at Bologna (1541). In 1542 he lectured at Padua on the Greek text of Aristotle, and in the following year made a tour through Italy, visiting the principal libraries, in order to compare the manuscripts of Galen and Celsus. He returned to his native country in 1544, and practised, first at Cambridge, then at Shrewsbury, and afterward at Norwich. He was appointed by Henry VIII. lecturer on anatomy to the company of surgeons, London. In 1547 he became Fellow of the college of physicians, and was appointed court physician to the young king Edward VI., which appointment he retained under Queens Mary and Elizabeth. In the reign of the latter, an exciting controversy arose between the surgeons and physicians of London, as to the right of the former to administer internal remedies for the sciatica. Caius argued the negative so ably on behalf of the physicians that the decision was against the right of the surgeons to continue the practice of administering medicines. He was elected president of the college of physicians for seven years in succession. There is extant a book of the college annals from 1555 to 1572 written by him in Latin, the earliest account we have of the transactions of that college. He was dismissed from the royal service in 1568 on suspicion of favoring the Catholic party. He obtained permission to endow and raise Gonville Hall into a college, which still bears his name (Gonville and Caius College) and accepted the mastership thereof. The last days of his life were passed in the seclusion of his college. His works are numerous, on various subjects; many of them have been reprinted in modern times.

Caius (kēz) College. See GONVILLE AND CAIUS COLLEGE.

Caix, kă-ēks, **Napoleone**, Italian philologist: b. Bozzolo, near Mantua, 1845. His education was obtained at Cremona and Pisa, and in 1869 he was called to the chair of ancient languages in the Lyceum of Parma, becoming professor of Romanic languages and comparative philology in the Institute of Higher Studies in Florence in 1873. He has been a prolific writer and among his many works are 'Saggio sulla storia della lingua e dei dialetti d'Italia' (1872); 'Sulla lingua del Contrasto' (1876); 'Le origini della lingua Poetica Italiana' (1880).

Cajabamba, kă-ha-bām-bā', Ecuador, capital of the province of Chimborazo, 102 miles south of Quito, on the arid plateau of Topi, at an elevation of 9,480 feet. The former town of Riobamba, founded on this site in 1533, was in 1797 overwhelmed by an earthquake in which 30,000 lives were lost. Pop. 16,000.

Cajamarca, kă-ha-mār-cā', or **Caxamarca**, Peru, the name of a department and city in the valley of the upper Marañon, or Amazon. The department lies in a very mountainous region. Pop. 213,391. The city stands on the eastern declivity of the Andes in a rich silver mining district, 75 miles from Trujillo. It contains several handsome churches, and flourishing manufactories of woollens and cutlery. The inhabitants are considered the best workmen in silver and iron in Peru. An extensive trade

CAJEPUT — CALABAR BEAN

between the inland provinces and Lambeyeque and Truxillo is carried on through this town. Woolen fabrics form the chief exports, and European manufactures, sugar, brandy, wine, iron, steel, and other articles are imported in return. In the vicinity are the baths of the Incas, and a volcanic lake, into which, according to tradition, were cast the throne and regalia of the Peruvian monarchs, the last of whom, Atahuallpa, perished here by the hands of Pizarro. Pop. 12,000.

Cajeput, kǎj'ē-pūt, or **Cajuput Oil**, the volatile oil obtained from the leaves of the cajeput-tree (*Melaleuca cajuputi* or *minor*), belonging to the order *Myrtacæ*. This tree has lanceolate, aromatic leaves and spikes of odorless flowers, and is common in many islands of the Malay Archipelago. Booro, one of the Moluccas, yields the bulk of the oil exported. It is mostly sent to Singapore, whence it is re-exported to other countries. The oil is of a pale-green color, very liquid, lighter than water, of a strong smell, resembling camphor, and of a strong pungent taste. It is often adulterated with other essential oils. The color of the oil depends on the presence of a little copper, which must be removed before the oil is fit for use in medicine, in which it has many applications, being used as a carminative, an antispasmodic, a rubefacient, and a sudorific. *Kayuputi*, the native name of the tree, means "white wood," and refers to the color of the bark.

Cajetan, kǎj'ē-tan, or **Cajetan**, **Tommaso de Vio**, Italian cardinal: b. Gaeta, 25 July 1470; d. Rome, 9 Aug. 1534. He entered the order of Dominican friars, graduated as a doctor, and was elected general of his order in 1508. When Pope Julius II. was summoned to appear before the council of cardinals assembled at Pisa and afterward at Milan, in the interest of King Louis XII. of France, Cajetan undertook his defense, asserting that to the Pope alone belonged the power of convening a council. He was appointed cardinal in 1517 by Leo X., and sent as a legate in Germany to bring the emperor Maximilian and the king of Denmark into the league formed against the Turks. His efforts to make Luther recant his doctrines proved in vain. In 1519 he was present, as Roman legate, at the assembly of the electors of the empire, and sided with the partisans of Don Carlos of Spain, who was elected emperor under the name of Charles V. Then he returned to Rome, but was soon ordered by Adrian VI. to Hungary, which was invaded by the Turks. In 1524 he was recalled to Rome by Clement VII. On the capture of Rome in 1527, being taken prisoner by the imperial troops, under the command of the constable of Bourbon, he had to pay 5,000 crowns as a ransom for his liberty. See Schilbach, 'De Vita ac Scriptis de Vio Cajetani' (1881).

Cajigal de la Vega, **Francisco Antonio**, frān-thēs'kō ān-tō'nē-ō kǎ-hē-gāl dā la vā'gā, Spanish colonial governor: b. Santander, 5 Feb. 1695; d. there, 30 April 1777. He held the post of governor of Santiago, Cuba, 1738-47, and in 1742 during the course of the war between Spain and England, repelled an attack by Admiral Vernon. He was governor-general of Cuba 1747-60, and while in office established an arsenal and a navy yard at Havana. During a part

of 1760 and the year following he was viceroy of Mexico.

Cajori, cā-yō'rē, **Florian**, Swiss-American mathematician: b. Saint Aignan, Switzerland, 28 Feb. 1859. He came to the United States in 1875 and studied at the University of Wisconsin. He has been professor of mathematics in Colorado College from 1898, besides holding similar positions prior to that date. He has published 'The Teaching and History of Mathematics in the United States' (1890); 'A History of Mathematics' (1894); 'A History of Elementary Mathematics' (1896); 'A History of Physics' (1899).

Cakchiquel, kāk-chē-kāl', a tribe of Mayan stock occupying northern and central Guatemala. They are probably an off-shoot of the Quichés, as they resemble that tribe closely in customs and language. They were conquered by Alvarado in 1524, and at that time had a well-developed civilization, as is shown by their architectural ruins and their system of hieroglyphic writings.

Cake-urchin, **Sand-cake**, or **Sand-dollar**, a flat, round sea-urchin (*Echinarachnius parma*) which lives buried in the sand in the shallow portions of the North Atlantic, from low-water mark to 40 fathoms. It is occasionally thrown ashore on beaches. The body is protected by limestone plates, and the "ambulacra," or delicate suckers, are arranged in a rosette on the upper side of the animal, the mouth being on the under side. See also SEA-URCHIN.

Cal'aba-oil, an excellent illuminating oil obtained from calaba-nuts, the seeds of *Calophyllum calaba*, a tree of the order *Guttifera* that flourishes in Brazil and the West Indies, and yields useful timber.

Calabar, ka-la-bar', or ka-la-bār', Africa, the former name of a district on the west coast, extending eastward from the Niger delta, and now included in the Niger Territories. The name is now applied to two towns and two rivers in that region. Old Calabar is a port in southern Nigeria, situated on the east bank of the estuary of the Cross River at the point where it receives the waters of the Old Calabar River. It contains, among other buildings, a Presbyterian Mission Institute for natives, a large prison, good hospitals, and marine workshops. Its climate, like that of all coast settlements in this part of the continent, is very unhealthy. The rainfall is very great, tornadoes are frequent, and the temperature is very high. The value of its exports, consisting chiefly of palm-oil, palm kernels, and rubber, exceeds \$1,000,000, and its imports are valued at rather more. New Calabar is situated farther west on one of the mouths of the Niger known by the same name. Its trade is less than that of Old Calabar, but is nevertheless of considerable value.

Calabar Bean, or **Ordeal Bean**, the brown or reddish-brown kidney-shaped seed of *Physostigma venenosum*, a climbing, woody, west African vine of the pea family (*Leguminosæ*). The flowers are purple, resembling the sweet-pea, and each pod contains two or three seeds, which are about one inch long with a blackish groove along the convex edge; and in the interior an air-cavity which enables the heavy seeds to float on water. This bean is very poisonous,

CALABASH GOURD — CALADIUM

and has been much used in paste or in infusion in the trial by ordeal of west African medicine-men. If the person accused of witchcraft or crime vomited the mixture, he was declared innocent; if he did not vomit, death ensued. At one time 70 children in Liverpool ate some of the beans; one who ate four seeds did not vomit and died; all the rest vomited and recovered. In poisoning with this bean vomiting should be encouraged, the stomach washed out, and atropine, the antidote, administered.

Cal'abash Gourd, Bottle Gourd, White Pumpkin, *Lagenaria vulgaris*, the only cultivated or common wild species of its genus which belongs to the natural order *Cucurbitaceae*, distinguished from the species of the closely related genus *Cucurbita* by having white instead of yellow flowers; separated instead of united anthers, and seeds with distended edges. It is a climbing annual vine, 30 to 40 feet long, with a musky odor and sticky feeling. It is a native of tropical Asia and Africa, and is grown in warm countries for its very variable smooth, hard-shelled fruit, which, while young and soft, is used by some races as food; but much more generally the ripe fruits are used for making utensils such as dippers, cups, and pitchers. Some of the largest fruits are used in India and other Eastern countries in raft-construction and for buoys. These fruits range in size from a few inches to five feet or even more, and from their resemblance to various objects are called Hercules' club, dipper, bottle, snake, sugar trough, etc. The plant is often cultivated in the southern United States, but is less frequently seen in the north, where the season is usually too short for the fruits to fully mature. A sunny exposure in warm, quick soil, and cultivation similar to that given squashes and melons will suit the plant well.

Calabash Nutmeg, a tree (*Monodora muristica*) of the order *Anonaceae*, introduced into Jamaica probably from west Africa. The fruit resembles small calabashes; hence the name. It is called also American nutmeg, or Jamaica nutmeg.

Calabash-tree, a tree (*Crescentia cujete*) of the West Indies and the continent of America, of the order *Bignoniaceae*, about the height and dimensions of an apple-tree, with crooked, horizontal branches, wedge-shaped leaves, pale-white flowers on the trunk and branches, and a roundish fruit, from two inches to a foot in diameter. The greenish-yellow skin of the fruit encloses a thin, hard, and almost woody shell, which is used for the same purposes as water-cans, goblets, cups, etc. So hard and close-grained are these shells that when they contain fluid they may even be put several times on the fire as kettles, without any injury. When intended for ornamental vessels, they are sometimes highly polished, and have figures engraven upon them, which are variously tinged with indigo and other colors. The calabash contains a pale-yellow juicy pulp of an unpleasant taste, which is esteemed a valuable remedy in several disorders, both external and internal.

Calabazar, *kä-lä-bä-thär'*, Cuba, a city of the province of Santa Clara, situated 20 miles north of the city of Santa Clara. It has a fine municipal building. Pop. 1,575.

Calabozo, *kä-lä-bō-thō'*, Venezuela, a town in the state of Miranda (Guzman Blanco), 120 miles south-southwest of Caracas, on the left bank of the river Guarico, in the midst of the Llanos. It was founded in 1730, is tolerably well built, and has rather a pleasing appearance. Its church, though not very handsome, is commodious. The principal wealth of the inhabitants consists of cattle. The neighboring ponds abound in electrical eels. Pop. 6,000.

Calabrese (*käl-a-brä'zé*) **II**, Italian painter whose real name was MATTIA PRETI: b. Calabria, 1613; d. Malta, 1699. He was chiefly celebrated for his frescoes. He worked for a considerable time in Malta, being employed in executing pictures on the walls of the cathedral.

Cala'bria, Italy, division of the kingdom, comprising the southwest peninsula or toe of Italy, from about 40° N. lat. to the Strait of Messina; area estimated at 6,663 square miles. It was formerly divided into three provinces — Calabria Citra, the most northerly; Calabria Ultra I., the most southerly; and Calabria Ultra II., between the two former; but these have been renamed respectively Cosenza, Reggio, and Catanzaro. The central region is occupied by the great Apennine ridge, wild and bleak, to which, however, whole colonies with their cattle migrate in the summer. The flats near the coast are marshy and unhealthy, and inhabited by herds of buffaloes; but the valleys at the foot of the mountains are well watered and produce most luxuriant vegetation. The vine, the orange and lemon trees, the fig, the olive, and all the fruits of southern climes, grow there to perfection. The climate was reckoned salubrious in ancient times; but in some places the accumulation of stagnant water produces disease in the hot season. Corn, rice, saffron, anise, licorice, madder, flax, hemp, olives, almonds, cotton, and sugar-cane are raised in abundance. Sheep, horned cattle, and horses are numerous. Near Reggio a kind of mussel is found, called *Pinna marina*, from whose silky byssus or beard a beautiful fabric is manufactured, remarkable for its extreme lightness and warmth. Coral is also fished. The quarries and pits afford alabaster, marble, gypsum, alum, chalk, rock-salt, lapis lazuli, and the fine copper renowned in ancient times.

Calabria corresponds with the ancient Bruttium and part of Lucania, while the ancient Calabria corresponds to the heel of Italy. In early received numerous Greek colonies, and formed part of Magna Græcia. In 268 B.C. it was conquered by the Romans. The Saracens had occupied the greater part of it when it was conquered by the Normans in the 11th century. Since then it has constantly followed the fate of the kingdom of the Two Sicilies, with which it was united to the kingdom of Italy in 1860. It was visited by a great earthquake in October 1870. The greater part of the inhabitants are poor. Formerly the country was much infested by brigands and brigandage is not yet entirely extinct. The language of the people is a corruption of the Italian. Pop. (1900) 1,366,982.

Caladium, *kä-lä-dī-üm*, a genus of succulent perennial herbs of the natural order *Aroideae*. There are about a dozen species, natives of tropical America. Several are largely

CALAH — CALAMBA

planted for ornament, for which their long petioled, often brilliantly marked, large, arrow-shaped leaves specially commend them. They give a rich subtropical effect in outdoor or greenhouse planting, and, being of rather easy culture, are very popular. The perennial rhizome is planted in rich, moist soil in the greenhouse, and transplanted in the garden after danger of frost has passed. Plenty of water is essential. In autumn the rootstock is dug before frost touches it, and stored in a cool, dry cellar.

Calah, kâ'la, an ancient city mentioned in Genesis x, 12 as one of those built by Asur. It is the city called Kalchu in the Assyrian inscriptions, which say that it was founded by Shalmaneser I. about 1250 B.C. It was rebuilt by Asurnazirpal about 880 B.C., who erected a wall on the northern side and a large palace. His successors also built palaces in the city. It is now known as Nimrud, where a number of important ruins and inscriptions have been found, among them the so-called "black obelisk" which tells of the tribute paid by Jehu, king of Israel, to Shalmaneser II.

Calahorra, kâ-la-ôr'ra, Spain, a town of Old Castile, near the south side of the Ebro, in the province of Logroño, and 40 miles east-southeast of the city of Logroño. It is a bishop's see, and contains three parish churches and three convents. In 78 B.C. this town, then called Calagurris, siding with Sertorius, was besieged by Afranius, one of Pompey's generals, and the inhabitants reduced to such extremity that they fed on their wives and children; whence the Romans were wont to call any grievous famine *fames Calagurritana*. Quintilian was born here. Pop. 8,821.

Calais, ka-lâ, France, a seaport town, and fortified place of the first class, in the department of Pas-de-Calais, 20 miles northeast from Boulogne, on the Strait of Dover, and about 23½ miles southeast of the port of Dover. It is situated at the junction of several canals, and by railway is directly connected with Paris, from which it is distant 185 miles. The town consists of two portions, almost entirely separated by basins or water areas connected with the harbor accommodation. These are Calais proper or the old town farther to the north, and St. Pierre or the new town lying to the south, and incorporated with the other portion only in 1885. The whole is enclosed by a new line of circumvallation, and is also defended by a citadel and detached forts and batteries. On the land side the country is flat and marshy, and can be laid under water to strengthen the defenses. The streets are broad and well paved, the houses substantially built of brick, and the hotels in general excellent. The chief square is the Place d'Armes, where the Hôtel de Ville, built in 1740 (restored in 1867), is situated. The principal church, Notre Dame, contains a fine altar-piece in Genoa marble. Other noteworthy objects are the Hôtel de Guise, originally founded by Edward III. of England; the column erected to commemorate the landing of Louis XVIII. in 1814; theatre; barracks; and the Hôtel Dessin. Calais is the seat of a commercial court and chamber of commerce, and has a college, a commercial school, school of design, school of hydrography, etc.

The harbor is accessible at all states of the tide, and is entered between two long piers. The works include a dry or graving dock 426 feet long at bottom, and having a depth of water on the sill of 28 feet 8 inches (at spring tides). There is also a wet-dock 27 acres in extent, with a depth of 25 feet. Calais is one of the principal ports for the debarkation of travelers from England (who are landed at the new railway station), there being day and night communication with Dover by steamboat. The number of travelers arriving and departing by sea is considerably over 200,000 per annum. There is a submarine cable to England from this port. The manufactures of the town are important. The silk and cotton tulle or bobinet trade employs about 15,000 artisans. Various other industries are also carried on, such as flax-spinning, engineering, net-making, brewing, etc. Vessels are built here, and fitted out for the cod, mackerel, and herring fisheries. A considerable trade is carried on in grain, wool, wine, sugar, timber, coal, etc., and not less than 55,000,000 of eggs are annually exported to England. Calais is a town of considerable antiquity. In 1347 it was taken by Edward III. of England, after a siege of 11 months. The famous incident of the six burghesses having their lives saved at the intercession of Queen Philippa belongs to this siege. In 1558 it was retaken by the Duke of Guise, being then the last relic of the French dominions of the Plantagenets, which at one time comprehended the half of France. Pop. (1901) 59,793.

Calais, kâl'is, Me., city, port of entry, and county-seat of Washington County, situated on the St. Croix River, opposite St. Stephen, N. B., and on the St. Croix & P. and the Canadian P. R.R.'s, 120 miles east of Bangor. It is the extreme northeast seaport of the United States and is connected by steamship lines with Boston, Portland, and St. John, N. B. It has a large lumber trade and numerous foundries, machine shops, shipyards, and other extensive mechanical industries; a national bank, several newspapers, high and grammar schools, electric lights, a public library, and an assessed property valuation of \$2,500,000. Pop. (1900) 7,665.

Calais, Pas de. See PAS-DE-CALAIS.

Cal'aite. See TURQUOISE.

Calaman'co, a woollen stuff made in the Netherlands, the warp of which is sometimes mixed with silk or goats' hair. It has a fine gloss, and is checkered in the warp, so that the checks are seen on one side only. It was fashionable in Addison's time.

Cal'amander Wood, a hard wood of Ceylon, obtained from a species of ebony-tree. See EBONY.

Cal'amary. See CEPHALOPODA, SQUID.

Calamatta, Luigi, Italian engraver: b. Civita Vecchia, Italy, 12 July 1802; d. Milan, 8 March 1869. He was educated in Rome, but was much in Paris, and is sometimes spoken of as French. He founded a school of engravers in Brussels under government direction, and in his latest years was professor of drawing in the Academy of Milan. He is well known by his engraving of the head of Napoleon.

Calamba, ka-lâm'ba, Philippines, a town of the province of Laguna, situated in the southern part of the island of Luzon, about 30 miles

CALAMBAC — CALANCHIA

southeast of Manila. It is connected with several important towns by highways, and has a telegraph station. Pop (1898) 11,480.

Calambac, aloes-wood, the product of a tree (*agila*) growing in China and some of the Indian islands. It is of a very light, spongy texture, and contains a soft, fragrant resin, which is chewed by the natives.

Calambuco, kă-lam-boo'kô, a very durable tree, found in the island of Luzon, Philippines. It is indestructible by ants, and is used for ship-building, making farming implements, etc.

Calame, Alexandre, ä-lëks-ändr kă-läm, Swiss landscape artist: b. Vevey, Switzerland, 28 May 1810; d. Mentone, France, 17 March 1864. His life was passed mainly in Geneva, where a monument was erected to him in 1880. He was ranked among the best landscape painters of his day and he excelled the most, if not all, of his contemporaries in portraying Alpine scenery. Among works by him are: 'Bernese Oberland'; 'Wetterhorn'; 'Lake of Lucerne'; 'Shreckhorn'; 'Lake of the Four Cantons.'

Calamianes, kă-la-mă-ăn's, a cluster of islands in the Philippine Archipelago, Busuanga, Calamian, and Linacapan are the most important; Busuanga is 36 miles long and 17 miles broad. They lie between lat. 11° 25' and 12° 20' N. and about lon. 120° E. The islands are mountainous and well timbered. They produce rice, cacao and great quantities of wax and honey. The climate is unhealthful. Pop. 14,291.

Cal'amine, a native hydrous silicate of zinc, having the formula $H_2O \cdot 2ZnO \cdot SiO_2$. The mineral, now known as smithsonite, was formerly included here, but James Smithson, in 1803, showed that the two species are distinct. Calamine occurs in hemimorphic, rhombohedral crystals, usually white, with a vitreous lustre, a hardness of from 4.5 to 5, and a specific gravity of between 3.4 and 3.5. It also occurs in massive forms, sometimes mammillary in shape, and often cellular. In the United States calamine is found in New Jersey, Pennsylvania, Virginia, Missouri, Utah, and Montana. In localities where it occurs pure and in quantity, it constitutes a valuable ore of zinc.

Cal'amint, any plant of the genus *Calamintha*, belonging to the natural order *Labiata*. The plants are herbs or shrubs with usually entire leaves, and dense whorls of purple-white or yellow flowers, with a two-lipped corolla and didynamous stamens not projecting from the corolla. Five species are British. They all contain a volatile oil, and a pectoral medicine is obtained from them. In the United States several species are also found.

Cal'amis, Greek sculptor, statuary and embosser of Athens, a contemporary of Phidias, who flourished between 467 and 429 B.C. Pliny bestows the highest praises upon his horses. Among his most celebrated works were a statue in metal of Apollo Alexicacos, in Athens, in 429 B.C., and which has erroneously been supposed to be the Apollo Belvedere; a colossal statue of Apollo in bronze, 30 cubits in height, which was taken to Rome by Lucullus; and a Jupiter Ammon consecrated by Pindar at Thebes.

Cal'amite, a genus of fossil plants very characteristic of the coal measures. They occur in the Devonian rocks, and in other formations

up to the Jurassic, in which one species is found. Their classification is not finally determined, but they are generally regarded as closely related to the *Equisetaceæ* or horsetails, of which they look like arborescent forms. The stalks are striated lengthwise, and interrupted from distance to distance with rings marking a regular articulation. Brongniart connected them with the *Conifera* and the *Cycadeæ*.

Cal'amus, a remarkable genus of palms, the plants of which belong to the eastern countries, and are very different from most other palms, having slender, many-jointed, reed-like stems, often stretching to a length of several hundred feet. Some have the stems erect, others climb and trail among other trees on which they support themselves, hanging on by the hooked prickles that terminate their leaves. Some have leaves at intervals along the stem, others only at the extremity. The stems are hard, smooth, and siliceous on the surface, and from their toughness and pliancy they are much used in the countries where they grow for matting, strong ropes, plaited work, etc. Bridges over streams are frequently made of ropes formed by twisting up their stems, and the native vessels of the Eastern seas often carry cables of the same kind.

Calamus, a popular name for the sweet flag (*Acorus calamus*), of the natural order *Aroideæ*. This plant is found in wet land from Nova Scotia to Florida, and westward to Kansas and Minnesota. The pungent bitterish acrid root-stocks have been used in medicine, especially among the colored people of the southern United States. It is sometimes cultivated as an ornamental plant in wet places, and is attractive for its erect, sword-shaped leaves, which in one variety are striped with yellow.

Cal'amy, Edmund, Puritan clergyman: b. London, England, February 1600; d. there, 29 Oct. 1666. He studied at Pembroke Hall, Cambridge (1616-19), where he attached himself to the Calvinistic party, and in 1639 was chosen minister of St. Mary's, Aldermanbury, London. He entered warmly into the controversies of the time, and became noted as a leading man on the side of the Presbyterians. He had a principal share in the composition of 'Smectymnus,' a work intended as a reply to Bishop Hall's 'Divine Right of Episcopacy,' and one of the most able and popular polemics of the day. Like the mass of the Presbyterian clergy, he was monarchical and not republican in his political opinions. He disapproved, therefore, of the execution of Charles, and of Cromwell's protectorate, and did not hesitate to avow his attachment to the Royalist cause. He was ejected for nonconformity in 1662.

Calamy, Edmund, English clergyman, grandson of the preceding: b. London, 5 April 1671; d. there, 3 June 1732. He was pastor of a congregation in Westminster and published an abridgement of Baxter's 'History of His Life and Times,' with a continuation; 'Inspiration of the Scriptures'; 'Life of Increase Mather'; 'Historical Account of My Own Life'; and also carried on through the press controversies with Bishop Hoadly and others.

Calancha, Antonio de la, Peruvian chronicler: b. Chuquisaca, 1584; d. Lima, 1 March 1654. He belonged to the Augustinian order,

CALANUS — CALATRAVA

and was rector of the College of San Ildefonso in Lima. He wrote 'Crónica moralizada del Orden de S. Agustín en Peru,' first printed at Barcelona in 1638 in folio, which is an important source for early Peruvian history. It was continued in a second volume, never completed, however, by Fray Diego de Cordova (Lima 1653). The first volume was translated into French as 'Histoire de l'Eglise du Perou aux Antipodes' (Toulouse 1653), and Brulius' 'Historia Peruana' (Antwerp 1651) is called a translation. The Spanish bibliographer Antonio credits Calancha with another work. 'De immaculate Virginis Mariæ conceptionis certitudine' (Lima 1629), but had not seen a copy. Brunet merely quotes Antonio on this point.

Cal'anus, Indian philosopher, much esteemed by Alexander the Great. At the age of 73, 323 B.C., being seized with illness at Persepolis, he caused a funeral pile to be erected, which he ascended with a composed countenance, and expired in the flames, saying, that having lost his health and seen Alexander, life had no more charms for him.

Calas, Jean, zhōn kā-las, or kā-lā, French judicial martyr: b. Languedoc, 1698; d. Toulouse, 9 March 1762. Brought up in the Protestant religion, he had established himself as a merchant in Toulouse. He had four sons and two daughters whom he educated himself, and was held in general esteem, when he was suddenly accused of the crime of murdering one of his sons. In 1761 his eldest son, Marc Antoine, a young man of irregular habits and a gloomy disposition, was found strangled in his father's house. It was reported that the unfortunate youth had been put to death by his father because he wished to become a Catholic. Jean Calas and his whole family were arrested, and a prosecution instituted against him, in support of which numerous witnesses came forward. The parliament of Toulouse condemned him, by eight voices against five, to be tortured and then broken on the wheel; and on 9 March 1762, the sentence was executed. He suffered the torture with firmness, and protested his innocence to the last. The youngest son was banished forever, but the mother and servant were acquitted. The family of the unhappy man retired to Geneva. Voltaire, then at Ferney, became acquainted with them, and for three years exerted himself to defend the memory of Calas, and to direct attention to the defects of the criminal law. The widow and children of Calas also solicited a revision of the trial. Fifty judges once more examined the circumstances, and declared Calas altogether innocent, 9 March 1765. The king by his liberality sought to recompense the family for their undeserved losses, and people of the first rank emulated each other in endeavoring to relieve them. See Coquerel, 'Jean Calas et sa Famille' (1858).

Calasiao, ka-lä-se-ä'ō, Philippines, a town of the province of Pangasinan, situated in the western part of the island of Luzon, a few miles from the coast of the Gulf of Lingayen. Pop. (1898) 13,750.

Calatafimi, kā-la-tä-fē'mē, Sicily, town in the western part of the island, in the district of Trapani, and 21 miles east-southeast of the city of Trapani. It is situated in a mountainous district, near the river Gaggera, is badly built, and has a ruinous castle on the summit of a neigh-

boring hill, now used as a prison. The environs are well cultivated and extremely fertile. In 1860 a battle took place here between Garibaldi's forces and Landi's Neapolitan troops, in which the latter were defeated. Pop. 10,964.

Calatagirone, kal-ta-je-rō'nā, or **Caltagirone** (ancient CALATA HIERONIS), Sicily, town in the province of, and 34 miles southwest of Catania. It stands on two hills, and consists generally of spacious, clean, and well-built streets. There is a fine promenade and market-place, beside which stands the old castle. It is the see of a bishop, and has several churches and a college. Its inhabitants are said to be the best workmen in the island. It has a considerable commerce, and is celebrated for the manufacture of terra-cotta ware. It was fortified by the Saracens, and wrested from them by the Genoese. Roger Guiscard gave it important privileges. Pop. about 34,000.

Calatayud, ka-lä-tā-yood', Spain, the second city of Aragon, 45 miles southwest of Saragossa. It stands on the Jalon, near its confluence with the Jiloca, at the foot of two rocky heights crowned with the ruins of Moorish forts. The upper or Moorish town is a very wretched place; but the modern town below is well built, and contains many remarkable edifices, among which the most conspicuous are the Church of Santa Maria, once a mosque, and surmounted by an octagonal tower; and that of St. Sepolcro, a Doric structure containing many curious relics. Red wines are produced in the neighborhood, and about 10 miles from the town there are sulphurous baths. The poet Martial was born at Bilbilis, a former town on the site of the present Bambola, two miles east of Calatayud. Pop. 11,055.

Calatrava, kā-lā-trä'va, **Order of**, a Spanish order of chivalry, originated during the Moorish wars. Calatrava la Vieja, taken from the Moors in the 12th century by the king of Castile, was committed to the Templars, who guarded it till 1158. At this time, a powerful army advancing to besiege it, they despaired of being able to defend it, and restored it to the king, who offered it in absolute property to whosoever would defend it. Two monks of the abbey of Cîteaux (Cistercians), in France, presented themselves and were accepted. They preached a crusade, and offered a pardon of sins, and being supplied with money and arms, were able to repel the invaders. Thereupon, having received the investiture of the town and other donations, they instituted the same year (1158) an order into which all the nobility of Castile and Navarre were emulous to enter. In 1164 the chevaliers of this order, by sanction of Pope Alexander III., separated themselves from the monks, and the order became purely military. They still followed the rule of the Cistercians, until Paul III. dispensed them from the vow of chastity. The almost uniform success of the Knights of Calatrava against the Moors gave rise to rashness, and in 1197 they were defeated and nearly exterminated, the survivors transferring the seat to the castle of Salvatierra. In 1523 the grandmastership was transferred to the crown by a papal bull, the knights being permitted to marry once by way of compensation for their loss of independence. Since 1808 the body has been continued as an order of merit.

CALATRAVA LA VIEGA — CALCINATION

Calatrava la Viega, kă-lă-trá'va la vĕ-ă'ha, a ruined city of Spain, situated on the Guadiana, about 12 miles northeast of Ciudad Real. Its defense against the Moors undertaken by Raymond, abbot of Fitero, and Diego Velasquez in 1158, after it had been abandoned by the Templars, is famous on account of its having originated the Order of Calatrava (q.v.) in 1158.

Calaveras, kăl-a-vă'ras, a river of California, rises among the hills at the foot of the Sierra Nevada, in Calaveras County, and after a westerly and southwesterly course joins the San Joaquin River, a few miles below Stockton.

Calaveras Grove, the most northern of the California groves of big trees, containing about 100 of these trees. The tallest one standing is known as the "Keystone State," and is 325 feet in height and 45 feet in girth; the "Mother of the Forest" is another tree of notable size, being 315 feet high and 61 feet in circumference. The grove is a State reservation.

Calc'-sinter, a form of carbonate of lime, the substance which forms the stalactites and stalagmites that beautify many caves. It is the same as travertine (q.v.). See CALCAREOUS.

Calcaire Grossier, kăl-căr grō-sĕ-ă, a chief type of the Eocene Tertiary series of the Paris and London basins. Its limestone strata furnish building material for the city of Paris. The fossils of the Calcaire Grossier are remarkable for number, and for the variety of forms, rising up to the mammalia.

Calcar, or **Kalkar**, Jan Stephanus van, yăn stĕ-fan'ūs vān kal'kar, Dutch painter: b. Calcar in Cleves, 1499; d. Naples, 1546. He studied so thoroughly the works of Titian, that their pictures cannot always be distinguished. The 'Mater Dolorosa,' in the Boisseree collection in Stuttgart, a perfect work of art, is by him. Another small picture of his, the 'Infant Christ with the Shepherds,' was a favorite with Rubens. In this piece the light is represented as proceeding from the child. He designed almost all the portraits in Vasari's Lives, and the figures for the anatomical work of Vesalius.

Calca'reous, a term applied to substances partaking of the nature of lime, or containing quantities of lime. Thus, we speak of calcareous waters, calcareous rocks, calcareous soils. Calcareous spar is crystallized carbonate of lime. It is found crystallized in more than 700 different forms, all having for their primitive form an obtuse rhomboid. The rarest and most beautiful crystals are found in Derbyshire, England. Calcareous tufa is an alluvial deposit of carbonate of lime, formed generally by springs, which, issuing through limestone strata, hold in solution a portion of calcareous earth; this they deposit on coming in contact with air and light. Calc-sinter is a variety of it.

Calcasieu, kăl'ka-shŭ, a river of Louisiana, rising in the western part of the State. It flows through the parish of the same name, and after a southerly course of about 200 miles enters the Gulf of Mexico through Lake Calcasieu.

Calcasieu Lake, situated in Calcasieu Parish, about five miles from the Gulf of Mexico, is little more than an expansion of the river of the same name. Length, about 18 miles; greatest breadth, five or six miles.

Calceola'ria (Latin, *calceolus*, a little shoe, alluding to the form of the corolla), a genus of plants of the natural order *Scrophulariaceae*, natives of South America, especially of Chile and Peru. They are characterized by having a corolla with a very short tube, with two lips, concave or shaped like a hood, the upper one very small, the under one greatly inflated. They are common as greenhouse or outdoor plants. These are upward of 60 species, of which about 20 are cultivated in the gardens of Europe, and their varieties are very numerous. The flowers of the indigenous species are white, yellow, and purple. They are greatly excelled in beauty by the cultivated varieties, which acquire numerous tints in these colors, and have besides on the lower part of the corolla, the part which bears the strictest resemblance to a shoe, large spots, or innumerable small points of a different color, which have a very graceful effect. They grow best in a rich, open, sandy garden mold, and are propagated by seeds or cuttings, the herbaceous kinds mostly by the former method.

Calchaqui, kal-cha'kĕ, a South American tribe formerly living in the northwestern part of Argentina. They were conquered by the Incas in the 15th century, and the ruins of their buildings and tombs indicate quite an advanced stage of civilization. They were visited by the Jesuit missionaries, but strongly opposed the inroads of the Spaniards. The tribe is now extinct and all record of their language is lost.

Calchas, kăl'kās, a legendary priest and prophet of the Greeks at the time of the Trojan war, who foretold that Troy would not be subdued by them till the 10th year of the siege. He himself accompanied the Greek army to Troy. During the siege, the Greeks were attacked by a plague, and Calchas declared that it was the effect of Apollo's anger, because they had deprived his priest of his daughter Chryseis, whom Agamemnon had selected as his mistress. He counseled the Greeks to appease Apollo by restoring the damsel; and it was by his advice that they afterward built the wooden horse. There are various legends relating to his death.

Calciferos, a geologic term applied to the sandy limestones found in Pennsylvania, extending across New Jersey and New York to Canada, and known as the Beekmantown beds. An equivalent formation is found in the magnesium limestones of Iowa and Missouri.

Cal'cimine, a mixture of zinc-white, glue, water, and pigments, used to finish the plaster walls of buildings. See WHITEWASH.

Calcination, a term now used as practically equivalent to roasting or oxidation. It is derived from the Latin word *calx*, meaning quicklime, and received its present signification by extension from its original meaning of obtaining lime from limestone by the application of great heat. By calcination many substances are reduced to a friable condition, and freed from constituents capable of passing off in the form of gas or vapor. Thus various salts may be deprived of water of crystallization, and rendered amorphous in this way; the hydrated carbonate of magnesium is reduced to the pure oxide, known as calcined magnesia; limestone is converted into quicklime, etc. Calcination is usually the first process in the extraction of metals from their ores. The oxides of metals



Photograph by J. Horace McFarland Co.

CALCEOLARIA (FISHERMAN'S BASKET)

CALCIOCELESTITE — CALCIUM

produced by this process were formerly known as calxes, but this term is now disused. It depends on circumstances which oxide is obtained, if the metal, like lead, can form more than one. The weight of the total calx is equal of course to that of the metal and the oxygen with which it has combined, but the calx itself is specifically lighter than the metal. Platinum, gold, silver, and some other metals, are not affected in this way, and on this account they are called the noble metals. See COMBUSTION.

Cal'ciocel'stite. See CELESTITE.

Cal'cite, -sit, a native carbonate of calcium, crystallizing in the rhombohedral system, but exhibiting a great variety of general forms or "habits." The mineral also occurs massive, fibrous, granular, and in many other physical states and shapes. Its typical crystals exhibit a very perfect cleavage, commonly splitting up, from a blow, into many small rhombohedrons. Pure crystals have a specific gravity of about 2.72, and a hardness of about 3, though the latter varies somewhat with the face of the crystal. Calcite may be transparent, translucent, or opaque, and in color may vary from white, or colorless, to black (in impure crystals); and it often shows pale shades of many other colors. It exhibits the phenomena of double refraction powerfully, and transparent crystals of it (called "Iceland spar" because first obtained from Iceland) are used in the manufacture of polarizing prisms. (See LIGHT.) Limestone, marble, and chalk are commonly classed as massive or cryptocrystalline varieties of calcite. Varieties containing notable quantities of the carbonates of other metals are named for the element or mineral that is thus present. For example, barite-calcite is a variety containing barium carbonate. Strontianocalcite, ferrocalcite, manganocalcite, zincocalcite, plumbocalcite, and dolomitic calcite are also recognized varieties, whose compositions are sufficiently indicated by the names. Upon being moistened with an acid, calcite gives off carbon dioxide with effervescence. It is one of the most widely distributed minerals known. A crystal weighing 165 pounds is in the mineralogical cabinet of Yale University. The minerals calcite, dolomite, magnesite, siderite, rhodochrosite, smithsonite, and sphærocobaltite, which are all carbonates crystallizing in the rhombohedral system, are collectively known as the "calcite group." Compare ARAGONITE.

Cal'cium, a metallic element first obtained in the free state by Sir Humphry Davy in 1808. Its compounds are exceedingly abundant and are widely distributed. Calcium carbonate, CaCO_3 , is familiar in the various forms of marble, chalk, limestone, and calcite. The sulphate, CaSO_4 , is also very common, and is perhaps best known in the form of gypsum, which contains two molecules of water, and therefore has the formula, $\text{CaSO}_4 + 2\text{H}_2\text{O}$. Calcium phosphate also occurs in nature in considerable quantities, both in the form of fossilized bones and as apatite (q.v.), and its various modifications.

Metallic calcium may be obtained by the electrolysis of the fused chloride (which melts at a red heat), or by decomposing the iodide with metallic sodium. It has a light yellow color, has a hardness about equal to that of gold, and (according to most authorities) is very malleable and ductile. Its chemical symbol is Ca, its specific gravity is about 1.58, and its

atomic weight is 40.0 if $\text{O} = 16$, or 39.7 if $\text{H} = 1$. Perfectly dry air does not affect it at ordinary temperatures, but in moist air it becomes rapidly coated with the hydrate, $\text{Ca}(\text{OH})_2$. When strongly heated in air it burns with a yellow flame, taking up oxygen to form the oxide, CaO . It decomposes water rapidly, passing into the form of the hydrate, with evolution of hydrogen. It melts at a red heat, has a specific heat of about 0.169, and has an electrical resistance only about one twelfth of that of mercury.

In its chemical relations calcium is a dyad. It combines with almost every known acid, and yields a vast number of compounds, many of which are of great industrial value. Of these the best known are the carbonate, oxide, hydrate, chloride, sulphate, fluoride, carbide, and bisulphide, and the indefinite mixture of the chloride and hypochlorite known as bleaching-powder (q.v.).

The carbonate occurs native in large quantities, as already noted. It is also commonly present in ground water as obtained from wells and springs. It is almost insoluble in pure water, but dissolves to a considerable extent when the water contains free carbon dioxide in solution. It is this compound that gives to water what is known as "temporary hardness." Upon boiling, the free carbon dioxide held in solution is expelled, and the lime carbonate is therefore precipitated also, so that the water loses that part of its hardness which is due to the presence of the carbonate. This effect is well illustrated, in regions where the soil is rich in limestone, by the crust of lime carbonate that is deposited upon the interior of household kettles that are used for heating water. Calcium carbonate also gives rise, in steam boilers, to troublesome deposits that keep the water out of contact with the metal plates, which often become overheated and seriously impaired in consequence. To prevent this action chemists often recommend the addition to the water in the boiler of a certain amount of ammonium chloride (sal ammoniac). This compound combines with the lime carbonate to form calcium chloride, which is exceedingly soluble, and ammonium carbonate, which is volatile, and therefore passes away with the steam. Beautiful as this process is in theory, it cannot be recommended for adoption in practice, because if the sal ammoniac is present in any excess it induces rapid corrosion of the boiler-plates. For a further discussion of boiler-scale, see SCALE.

When calcium carbonate (more familiarly known as carbonate of lime) is strongly heated in a current of air, it loses its carbon dioxide and becomes converted into a substance known to the chemist as calcium oxide CaO , and in the arts as quicklime, burnt lime, or simply lime. Pure calcium oxide (or lime) is a white, amorphous substance, extremely infusible, glowing with a dazzling white light when strongly heated, possessing caustic properties, and acting as a powerful chemical base. When treated with about one third of its own weight of water, lime passes into the form of the hydrate or hydroxide, $\text{Ca}(\text{OH})_2$, with the evolution of much heat. The process of converting it into the hydrate by the addition of water is called slaking, and the resulting hydrate is known in the arts as slaked lime. Mortar is composed of a mixture of slaked lime and sand, the silica (or sand) slowly combining with the lime to form a silicate after the

CALCIUM CARBIDE — CALCULATING-MACHINES

mortar has been applied. Slaked lime, or calcium hydrate, is somewhat soluble in water, its solution being known as lime water.

Calcium chloride is formed when calcium carbonate is dissolved in hydrochloric acid. It is exceedingly soluble, but upon evaporation of its solution it separates in white, needle-like crystals having the formula $\text{CaCl}_2 + 6\text{H}_2\text{O}$. When these are heated to about 400°F . they lose two thirds of their water of crystallization and become converted into $\text{CaCl}_2 + 2\text{H}_2\text{O}$, in which form the chloride is commonly used. Thus prepared, calcium chloride is a white, porous solid, which absorbs moisture with great avidity, and hence is exceedingly valuable to the chemist and physicist for drying air and other gaseous bodies. It forms crystalline compounds with ethyl and methyl alcohols, which are again resolved, by the addition of water, into calcium chloride and the free alcohol. On account of this property it has been used for the preparation of these alcohols in the pure state.

Calcium sulphate occurs native in the anhydrous form, as the mineral anhydrite; and, combined with two molecules of water, it also occurs abundantly as gypsum. It is soluble in 400 parts of water, and, like the carbonate, it occurs quite generally in the waters of wells and springs. Like the carbonate, too, it makes the water in which it occurs hard; but the hardness due to the presence of the sulphate cannot be removed by boiling, and it is therefore said to be "permanent." Calcium sulphate produces deposits in steam boilers that are far more troublesome and injurious than those due to the carbonate, since the sulphate is deposited in a hard, compact, stony form, and can be removed only with difficulty. See SCALE.

When gypsum is moderately heated it loses its water of crystallization and becomes converted into a substance that is commercially known as plaster of Paris, from the fact that the gypsum from which it is prepared (and which is also called plaster of Paris, though rarely), occurs abundantly in the Tertiary formations of the Paris basin. Plaster of Paris, when moistened by the addition of the proper quantity of water, takes up two molecules of water again, and rapidly sets into a hard, solid mass which expands somewhat at the instant of solidification. It is greatly used in making casts and molds. These are harder and better when the plaster is wetted with a solution of alum than they are when pure water is used for this purpose. If equal weights of the anhydrous sulphates of calcium and of potassium are wetted with about four parts of water, the mixture sets like plaster of Paris, with the formation of a double sulphate of calcium and potassium, having the formula, $\text{CaSO}_4, \text{K}_2\text{SO}_4, \text{H}_2\text{O}$. The casts so obtained exhibit polished surfaces, superior to those obtained with the pure plaster.

Calcium fluoride, CaF_2 , occurs native as fluor spar, or fluorite, and is used to some extent as a flux in metallurgical operations, to which circumstance it owes its name (Latin *fluor*, a flux). It is also used in the manufacture of vases and other ornamental articles and as a source of hydrofluoric acid, which is set free when the fluoride is treated with warm sulphuric acid.

Calcium carbide, CaC_2 , has long been known, and was prepared by Wöhler in 1862 by melting an alloy of zinc and calcium in the presence of

carbon. Its commercial importance, however, dates from the discovery made by Mr. T. L. Willson in 1892, that it can be formed by the direct combination of lime and carbon at the temperature of the electric furnace. Large quantities of it are now made by this process at Niagara Falls, at Spray, N. C., and elsewhere. Calcium carbide in its commercial form is a dark-gray substance, often almost black. It is hard, infusible, and incombustible, with a specific gravity of about 2.24. Its value in the arts depends upon the remarkable fact that when it is thrown into water a double decomposition occurs, by which acetylene gas is formed, in accordance with the equation $\text{CaC}_2 + 2\text{H}_2\text{O} = \text{C}_2\text{H}_2 + \text{Ca}(\text{OH})_2$. See ACETYLENE; CARBIDE.

Calcium sulphite, CaSO_3 , is formed and precipitated as a white powder when a solution of a calcium salt is added to a solution of an alkaline sulphite. The sulphite so formed requires 800 parts of pure water to effect its solution. It is far more soluble in sulphurous acid, however, and it is believed that the sulphurous acid acts upon it to produce a new but comparatively unstable compound, $\text{CaSO}_3 \cdot \text{SO}_2$, to which hypothetical substance the name calcium bisulphite, or bisulphite of lime, has been given. Upon exposure to air the bisulphite solution gradually deposits crystals of the monosulphite, having the composition, $\text{CaSO}_3 \cdot 2\text{H}_2\text{O}$. On the commercial scale the bisulphite solution is prepared by passing sulphur dioxide gas (SO_2) through "milk of lime" (that is, water containing slaked lime in suspension). The monosulphite of lime is first formed, and by the continued action of the sulphur dioxide this passes into solution in the form of the bisulphite. The usefulness of bisulphite of lime in the arts depends upon its power of dissolving the gums and resins by which the fibres of wood are cemented together. Thus, in the sulphite process of manufacturing wood pulp, chips of wood are submerged in a solution of the bisulphite and heated for some hours in closed digesters, by the action of steam. By this means the chips are disintegrated, the gummy connective materials being entirely dissolved away, and the wood being thereby reduced to a mass of separate fibres, which after simple washing and bleaching, are ready for use in the manufacture of paper.

Calcium Carbide. See ACETYLENE; CALCIUM; CARBIDE.

Calcium Light, a brilliant light produced by directing the flame of an oxy-hydrogen blow-pipe against a block of compressed quicklime. It had long been known that lime emits a light of extraordinary brilliance and whiteness when strongly heated in this manner, but the first practical application of the principle was made by Capt. Thomas Drummond in 1825, in connection with the trigonometrical survey of Ireland. The calcium light is now constantly employed in the production of theatrical effects, and for the projection of photographic pictures upon a screen. It is also called Drummond light, lime-light, and oxy-hydrogen light.

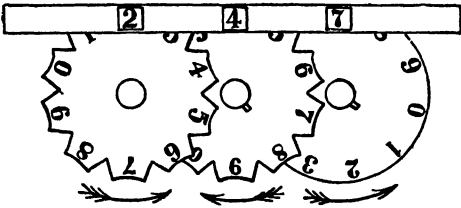
Calculating-machines. The simplest form of calculating mechanism in common use is the slide-rule, which consists usually of three strips, bearing graduations, the centre strip sliding between the others. The scales being graduated to logarithms, and one function of a number being on a stationary strip, and another function

CALCULATING-MACHINES

on the sliding strip, movements of the strip afford a sight reading of a variety of calculations. A mechanism identical in principle with the slide-rule is the calculating-circle, in which graduated rings are substituted for the strips or slides.

The counter used in street cars to register fares, the cyclometer, odometer, and cash-register are all simple forms of calculating machines, based on the principle common to nearly all these machines, namely, the use of a disk or wheel bearing figures from 0 to 9 inclusive. A very simple form is shown in the illustration. When the disk at the right has completed one revolution it advances the centre disk one step; and so on successively at each revolution of the right-hand disk until after 10 revolutions the centre disk has likewise completed a full revolution, when it in turn advances the left-hand disk one step and thus registers 100. The train of disks may be extended to register any number desired. Apertures in the casing of the train enable the figures to be read.

During recent years the keyboard type of calculating machine has come into extended use in banks, business houses, and other concerns where numerous and tedious calculations have to be made. There are a number of these machines, but that of Dorr E. Felt of Chicago is



Wheels of a form of counter, illustrating the principle common to nearly all calculating machines.

perhaps the best known. This was introduced in 1889, and has been improved several times, the different styles being known as the comptograph and comptometer. The comptograph is the more complete machine of the two, and prints the record of its work as performed. The comptometer is very similar, but does not print its record, and hence cannot be used for listing. Either machine performs any of the four arithmetical operations of adding, subtracting, multiplying, and dividing, besides extracting the square root. In the comptograph the totals are recorded in front of the operator, and, if, by accident, wrong keys have been struck, they can be instantly released by touching a release key, after which the correct keys can be struck.

The keys resemble those of a typewriter. They are arranged in columns, the first column on the right representing units (1, 2, 3, etc.), the next column tens (10, 20, 30, etc.), the next hundreds, and so on. Two figures (a large and a small one) appear on the top of each key. In addition and multiplication the keys are struck with reference to the large figures, while in subtraction, division, and square root, the small figures (which are red) guide the operator. Addition is performed by touching the large figure keys of the proper numbers to be added, and standing in their proper columns, all the columns being added at one time, the carrying being done automatically by the machine, with

no attention from the operator. In multiplication the operator begins at the right of the row of keys indicated by the first figure of the multiplier, and strikes each successive row in the same row toward the left as many times as indicated by the corresponding figure in the multiplicand, and then proceeds with each of the other figures of the multiplier as with the first, beginning always in the column of keys in which the figure of the multiplier stands. To multiply such a sum as 198 by 377, it is only necessary to strike three keys, but these must be selected according to their positions in the columns.

In dividing, the number to be divided is first struck on the keys, precisely as in addition, and then the divisor is struck with respect to the smaller figures on the keys, the operator striking the proper keys continually (never more than nine times) until the figures in the complementary place agree with the number of strokes on the keys, and the answer then shows on the register.

In 1900 Felt patented a machine to compute in pounds, shillings, and pence, and this is now being introduced in Great Britain. James Mallmann, of Sheboygan, Wis., has recently produced a machine of the keyboard type that has attracted some attention. So has D. J. T. Hiett, of St. Louis. Somewhat less pretentious among new machines is the arithmachine of Henry Goldman, of Chicago, and the machine of James B. Moore, of New York, operating with registering tape and slides.

Among foreign machines that have attracted comment are the Thomas machine, used in France; the Tate, an improved Thomas, employed in Great Britain; the Odliner, used in Poland; and Babbage's differential machine, which cost \$100,000, and calculates logarithms besides performing operations in trigonometry.

The Hollerith electric tabulating mechanism used by the United States Census Bureau is prominent among the remarkable calculating machines that have been developed in America. Three separate machines constitute the outfit. The first one punches holes in cards, in any one or more of 240 places; the second tabulates the cards, while the third sorts them. Machine No. 1 has a keyboard of 240 keys, this being the number of answers called for in the census blanks of the bureau. The operator takes a return blank, representing the report of some individual, and, as he reads it, strikes the appropriate keys, which results in the punching of a card, that becomes a mechanical counterpart of the original return. As the average number of questions answered on each return is but 15, the work is not so tedious as might be inferred from the statement as to 240 questions.

When the cards of a State have been punched, they are brought to the tabulating machine, which is the real calculator. This machine reads the holes of the cards that are fed into it, and makes an electrical record of each hole, according to its position, adding up the totals for each hole, and showing them on dials. When the cards are all fed through, the total of each of the 240 replies is enumerated. The third machine is a sorting box, which serves to secure answers to cross-questions. For instance, if it is desired to know how many white persons are among the total number convicted of crime, the sorting box will locate all cards having the holes corresponding to these two statements, and give the

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total. In this way a great variety of statistics are made available which it would be too expensive to gather or compute in any other way. For other information on this subject, see CASH REGISTER; DIFFERENCE MACHINE.

C. H. COCHRANE.

Calculus. 1. A term applied in medicine to more or less hard masses which form in the animal tissues or fluids and act as foreign bodies. Those of the gall-bladder or bile passages are known as gall-stones; those in the urinary organs as urinary calculi; and those of the intestine as enteroliths. There also occur rhinoliths in the nose, amygdoliths in the tonsils, pneumoliths in the lungs, and pancreatic calculi in the pancreas. Gall-stones vary in size from a pin-head to a marble, number from one to several hundred, are easily crushed, and are composed mainly of cholesterolin or bilirubin-calcium, or mixtures of these. Their production is favored by tight lacing and sedentary habits, so they are most common in women. Usually bacteria are present. Most gall-stones give no symptoms. They may, however, block up the bile passages and dam back the bile, or, by passing through the bile-ducts into the intestines cause the intolerable pain known as biliary colic (q.v.), or, by lying in the gall-bladder, cause inflammation of that organ.

Urinary calculi occur most frequently in middle or advanced life, and are renal when they occur in the kidney ("stone in the kidney"), and vesical when in the bladder ("stone in the bladder"). These stones are formed by the deposit of urinary solids, as uric acid, the urates, calcium oxalate, carbonate, and phosphate, cystin, and xanthin, held together by an albuminous framework. Such a stone is very hard, and when cut through shows a laminated varicolored surface, which may be quite pretty when polished. Uric acid deposition is favored by a high percentage of uric acid, high acidity, and lack of mineral salts and pigment. Urinary calculi may be rough and warty or sharp and crystalline. Fine stones are known as "gravel," which some persons pass at intervals with more or less pain. The symptoms of stone in the bladder are sudden temporary stoppage of urine, pain at the end of urination, and sometimes blood in the urine. A stone that is capable of obstructing the flow of urine requires surgical removal (see LITHOTOMY); otherwise attention to the system and regulation of the diet and habits of life may suffice. The passage of a stone from the kidney to the bladder produces renal colic (q.v.), which is extremely painful.

2. In mathematics, a term under which are included several branches of the higher mathematics. The name, however, is commonly restricted to two subjects, more specifically defined as the differential calculus and the integral calculus. Ordinarily the calculus is the branch of mathematics which is undertaken by the student after studying analytic geometry (q.v.). It is in analytic geometry that the student learns to distinguish between variable quantities and constants, and to conceive of quantity as in a state of growth or change. But while, in analytic geometry, quantities are considered at certain definite points in their growth, in the calculus the rates of change are themselves made the subject of investigation and analysis.

The "differential" of a variable quantity, or "variable," is its rate of change. From another point of view the differential is regarded as the actual increment of a quantity in a period of time so short that the increment is an "infinitesimal"; that is, a fraction so small that any of its powers may be neglected in comparison with the next lower power. For example, the square of the fraction one billionth is negligibly small when compared with one billionth. Those who prefer this method speak of the branch of mathematics under discussion as the infinitesimal calculus. It must be confessed that the infinitesimal philosophy leaves something to be desired; but as a matter of fact, in actual analysis, the minute increments are used in such a way that the apparent residual errors really are reduced to zero, so that the results obtained are strictly correct. We may see how the two methods reach agreement by considering that the actual rate, at any instant, of a railway train that is getting up speed may be obtained to any desired degree of accuracy if we measure the actual distance traversed in such a period as the one millionth of a second, or the one quadrillionth of a second, etc.

When one quantity is dependent for its value upon one or more other quantities, the first is said to be a "function" of the others. The latter are said to be "independent variables" and the first is the "dependent variable." The rate of change of an independent variable is assumed to be uniform—so much a second, for example. The problem of the differential calculus is to determine the rate of change, or the differential, of the dependent variable. It is evident that this rate depends not only on the differential of the independent variable, but also, in most cases, on the value of the independent variable. To illustrate, suppose $y = x^2$. Then y varies twice as fast when x has reached the value 2 as it does when x is 1. The general problem stated above is the whole of the differential calculus regarded simply as a method of analysis. The applications are many and important, however. Among them we may mention questions in "maxima and minima," finding the radii of curvature of curves whose equations are known, determining the value of algebraic and other expressions which seem to be indeterminate, etc.

The integral calculus is the converse of the differential. Its fundamental problem is to determine the relation between quantities when the relation between their differentials is known. The general problem of the differential calculus is completely solved; that is, any known function can be differentiated. The same is not true, however, of the integral. Only a small number of the possible differential functions can be integrated. Nevertheless the integral calculus has been brought to a high degree of development, and, with the differential, constitutes an indispensable method for a great range of physico-mathematical work. The calculus is the characteristic tool for modern scientific investigation.

The calculus was invented by Newton at some date prior to 1669. His methods were not published for several years, however, and meantime the German mathematician, Leibnitz, published a work presenting substantially the same processes, though with a different notation. Thereupon ensued a bitter controversy as to whether Leibnitz had made use of suggestions from cer-

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tain papers of Newton, to which he had had access. The general opinion is that Leibnitz was entirely without fault, that his work was original, though subsequent to that of Newton. One or two modern authorities of high standing, however, lean to a view not so generous toward Leibnitz. The notation of the German is confessedly superior to Newton's, and it has been generally adopted. It does not belittle the achievements of these masters to point out that the growth of mathematics under the hands of their predecessors had brought the science to such a condition that the calculus, in some form, was pretty sure to come. It is not surprising that this invention should have appeared in more than one place at nearly the same time, as other discoveries have done when the world was ready for them.

Almost all the great mathematicians of the century following Newton's death wrote on the calculus. Of late, however, though many textbooks on the subject have been printed, the really important work in mathematics has been the investigation of subjects lying beyond the calculus, sometimes based upon it, and quite generally assuming its methods as understood.

Calcut'ta ("the ghaat or landing-place of Kālī" from a famous shrine of this goddess), India, the capital of British India, and of the presidency and province of Bengal, is situated on the left bank of the Hooghly (Húghli), a branch of the Ganges, about 80 miles from the Bay of Bengal. The Hooghly is navigable up to the city for vessels of 4,000 tons or drawing 26 feet; the navigation, however, on account of sand-banks which are continually changing their size and position, is dangerous. The river opposite the city varies in breadth from rather more than a quarter to three quarters of a mile. The city may be said to occupy an area extending along the river for about five miles from north to south, and stretching eastward to a distance of nearly two miles in the south, narrowing in the north to about half a mile. The eastern boundary is nominally formed by what is known as the Circular Road, the Lower Circular Road forming part of the southern boundary. Another eastern boundary on the north is the Circular Canal, which runs for some distance parallel to the Circular Road. The southwestern portion of the area thus spoken of is formed by the Maidan, a great park stretching along the river bank for about one and three quarters miles, with a breadth in the south of one and a half miles. This grassy and tree-studded area is one of the ornaments of Calcutta; it is intersected by fine drives, and is partly occupied by public gardens, a cricket ground, race-course, etc., and partly by Fort William, which rises from the river bank. It was built in 1757-73, being begun by Clive after the battle of Plassey, and is said to have cost about \$10,000,000. Along the river bank there is a promenade and drive known as the Strand Road, which has for the most part been reclaimed from the river by successive embankments. Along the east side of the Maidan runs Chauringhi Road, which is lined with magnificent residences, and forms the front of European fashionable residential quarter. Along the north side of the Maidan runs a road or street known as the Esplanade, on the north side of which are Government House and other public buildings. The European commer-

cial quarter lies north of the Esplanade, between it and another street called Canning Street, having the river on the west. The centre of this area is occupied by Dalhousie Square (enclosing a large tank or reservoir), and here there are a number of public buildings, including the post-office, telegraph office, custom house, Bengal secretariat, etc. The European retail trading quarter occupies a small area to the east of the above area. Everywhere outside of the European quarters Calcutta is interspersed with *bastis*, or native hamlets of mud huts, which form great outlying suburbs. "The growth of the European quarters, and the municipal clearings demanded by improved sanitation, are pushing these mud hamlets outward in all directions, but especially toward the east. . . . They have given rise to the reproach that Calcutta, while a city of palaces in front, is one of pig-styes in the rear." First among the public buildings is Government House, the viceregal residence, situated, as already mentioned, on the Esplanade. It was built in 1799-1804, and with its grounds occupies six acres. Four wings extend toward the four points of the compass from a central mass which is crowned with a dome and approached from the north by a splendid flight of steps. Besides accommodating the viceroy and his staff it contains the council chamber in which the supreme legislature holds its sittings. The high court, the town hall, the bank of Bengal, the currency office, post-office, etc., are among the other public buildings in this locality, while further to the north stands the mint, near the bank of the Hooghly. The chief of the Anglican churches in Calcutta is the cathedral of St. Paul's, at the southeastern corner of the Maidan, a building in the "Indo-Gothic" style, with a tower and spire 201 feet high, consecrated in 1847. St. John's Church, or the old cathedral, is another important church, in the graveyard surrounding which is the tomb of Job Charnock, founder of Calcutta. The chief Presbyterian church is St. Andrew's or the Scotch Kirk, a handsome Grecian building with a spire. The Roman Catholics have a cathedral and several other churches; and there are also places of worship for Greeks, Parsees, and Hebrews. Hindu temples are numerous, but uninteresting; among the Mohammedan mosques the only one of note is that which was built and endowed by Prince Ghulam Mohammed, son of Tippoo Sultan. The religious, educational, and benevolent institutions are numerous. Various missionary and other religious bodies, British, European, and American, are well represented. There are four government colleges—the Presidency College, the Sanskrit College, the Mohammedan College, and the Bethune Girls' School. There are five colleges mainly supported by missionary efforts; besides several others, some of them under native management. Other educational institutions include Calcutta Medical College, a government school of art, Campbell Vernacular Medical School, and a school of engineering at Howrah, on the western side of the river. Besides these there is the Calcutta University, an examining and degree-conferring institution. Among the hospitals are the Medical College Hospital, the General Hospital, the Mayo Hospital (for natives), and the Eden Hospital for women and children. The Martinière (so named from its founder, Gen. Martin, a Frenchman in the Company's ser-

vice) is an important institution for the board and education of indigent Christian children. Elementary and other schools are increasing in numbers. In this connection we may mention the Asiatic Society, founded by Sir W. Jones in 1784, for the study of the languages, literature, antiquities, etc., of Asia; and the Botanic Garden, which occupies a large area on the right bank of the river. Calcutta possesses a number of public monuments, most of them in or about the Maidan. Several governors-general are thus commemorated, as also Sir David Ochterlony and Sir James Outram, "the Bayard of the East," of whom there is an admirable equestrian statue by Foley. The city is lighted partly by gas, partly by electricity. There is an extensive system of tramways. The sanitation of Calcutta, though vastly improved in recent years, is still defective, more especially in the suburban districts, where the *bastis* or native huts are so common. One difficulty in the way is the site of the city itself, which is practically a dead level. An act which came into force in 1889 brought a large additional area under the municipal authorities, and since then much has been done in the way of drainage, opening up of arterial streets, alignment of roads, etc. The water supply has also been greatly increased, and filtered water from the Hooghly (there is a pumping station at Palta, 16 miles above Calcutta) is now available at the daily rate of 36 gallons per head in the city, and over 15 in the suburbs, besides a supply of unfiltered water for washing and other purposes. The mortality over the entire municipality in 1893 was 29.5 per 1,000, a great improvement on former times. The death-rate is far higher among the natives than among the Europeans, and in the native quarters cholera is said to be seldom entirely absent. The healthiest months are July and August, which form part of the season of rains; the unhealthiest are November, December, and January. The mean temperature is about 79°, the average rainfall a little over 66 inches. Calcutta belongs to an area that is subject to periodical cyclones, which sometimes do an immense amount of injury. One of the most violent of these was in 1864, when enormous damage was done to the town and shipping in the river, with great loss of life. Out of 195 vessels only 23 remained uninjured, many being totally wrecked. The port of Calcutta extends for about 10 miles along the river, and is under the management of a body of commissioners. Opposite the city it is crossed by a great pontoon bridge, which gives communication with Howrah for vehicles and foot passengers, and can be opened at one point to let vessels pass up or down. It cost \$1,100,000. Besides the accommodation for shipping furnished by the river, there are also several docks. The trade is very large, Calcutta being the commercial centre of India. There is a very extensive inland trade by the Ganges and its connections, as also by railways (the chief of which start from Howrah), while almost the whole foreign trade of this part of India is monopolized by Calcutta. In 1897-8 the gross tonnage of the shipping inward and outward was over 5,000,000 tons; while the total of exports and imports was 71,994,608 tens of rupees, the exports being largely in excess of imports. The chief exports are opium, jute, and jute goods, tea, grain and pulse, oil-seeds, raw cotton, indigo, hides and skins, silk and silk goods, etc.

The most important import is cotton goods. The jute manufacture is extensively carried on, also that of cottons.

The first factory in Bengal of the East India Company, which was incorporated by royal charter in the year 1600, was established at Hooghly, 28 miles farther up the river, in 1644. Job Charnock, the company's agent, was driven out of this settlement in 1686, and the English then occupied part of the present site of Calcutta, which in 1689-90 became the headquarters of the commercial establishments of the company in Bengal. In 1700 the company acquired from Prince Azim, son of the Emperor Aurengzebe, the three villages of Sutánnati, Kalikata (Calcutta), and Govindpore, for an annual rent of 1,195 rupees, and these formed the nucleus of the present city. The original Fort William, named after William III., was built in 1696, on a site considerably to the north of the present fort. Calcutta was taken and plundered by Suraj-ud-Dowlah in 1756, and retaken by Lord Clive in 1757. To the capture by Suraj-ud-Dowlah belongs the episode of the "Black Hole" (q.v.) of Calcutta. When the British recovered possession, much of the town was in ruins and had to be rebuilt, so that it may be said to date only from 1757. Clive built the new Fort William on the site of Govindpore, between 1757 and 1773. In 1773 Calcutta became the seat of British government for the whole of India. Since then the history of Calcutta has been an almost unbroken record of progress and prosperity. Pop. (1901) 1,121,664.

Caldani, käl-dá'nē, **Leopoldo** (lā-ō-pōl'dō) **Mar'co Antō'nio**, Italian anatomist: b. Bologna, 21 Nov. 1725; d. Padua, 30 Dec. 1813. He was professor of anatomy in the university of Bologna, where, after a great number of experiments, he published his work on the 'Insensibility of Tendons.' But impatient of the contradictions which his views received, he left Bologna for Padua, and succeeded Morgagni there. At an advanced age, and with weak eyes, he published, with some assistance, a series of accurate anatomical plates, (*Icones Anatomicae*.)

Caldara, käl-dā'ra, **Antonio**, Italian composer: b. Venice, 1678; d. there, 28 Dec. 1763. At the age of 18 he wrote an opera, which was successful, and for many years thereafter devoted himself exclusively to that species of composition. He was for a while instructor in music to the emperor Charles VI. at Vienna. He abandoned the stage on the failure of his opera of 'Themistocles,' and during the remainder of his life wrote sacred music, which is generally preferred to his operas.

Caldara, Polidoro. See CARAVAGGIO.

Caldas, Francisco José de, Columbian naturalist: b. Popayan, New Granada, 4 Oct. 1771; d. 29 Oct. 1816. His life was a remarkable illustration of what a love for science can accomplish, when united to an indomitable will. Although he had neither teachers, books, nor instruments, he became a notable botanist, chemist, and astronomer, manufacturing for himself the instruments he needed. With the Spanish explorer J. C. Mutis, he made several important journeys of exploration, more particularly in the Andes. He was made director of the observatory at Bogata, and in 1807 founded the 'Semenario de la Nueva Granada,' a jour-

nal in which he published a number of scientific observations of great interest and value (reprinted, Paris 1849). When the revolt in favor of independence took place in New Granada, 1816, Caldas declared himself in favor of his country's liberty and was executed by order of Morillo.

Caldas Barboza, Domingos, Brazilian poet: b. Rio de Janeiro, 1740; d. Lisbon, Portugal, 9 Nov. 1800. His mother was a negress. He served for a time in the Brazilian army, taking part in the siege of Colonia do Sacramento, 1762. Later he went to Lisbon, where he found generous patrons in the Vasconcellos. He became a great favorite in society on account of his skill in improvisation and songs accompanied by the viol. His poems are tinged with a sadness and pessimism natural in one upon whom the shadow of his humble origin lay heavily. His works are: 'A Doença' (1777); 'Recopilação da Historia Sagrada' (3d ed. 1819); 'A Vingança da Cigana' (1794); 'Cântigas' (1806-7).

Cal'das de Mon'buy, Spain, a small town in Catalonia, about 20 miles north of Barcelona. It contains hot mineral springs of such a temperature that the inhabitants bring eggs, vegetables, etc., to boil them in the water. When cooled, it is drunk for scrofulous and rheumatic complaints. Pop. 2,409.

Caldas Pereira de Souza, pẽ-rá'ra dâ soo'za, **Antonio**, Brazilian poet: b. Rio de Janeiro, 1762; d. 1814. His writings, which are marked by a high moral tone, especially an ode on 'Man in the State of Barbarism,' were published in Paris in 1821, under the title of 'Poesias sagradas e profanas,' with a commentary by Stockler. At Coimbra, where the poet had studied, a new edition of his poetical works, exclusive of his translations, was brought out in 1836. While at the University of Coimbra he gave umbrage to the inquisition; and on being consigned to a convent devoted himself to the clerical profession.

Caldecott, Alfred, English clergyman and educator: b. Chester, 1850. He is a brother of Randolph Caldecott (q.v.) and was educated at the universities of Edinburgh and Cambridge. He is professor of logic and philosophy at King's College, London; rector of Frating, Essex, and minor canon of Westminster, and has published: 'English Colonization and Empire' (1890); 'The English Church in the West Indies' (1898); 'The Philosophy of Religion in England' (1901).

Caldecott, kâl'dê kôt, Randolph, English illustrator: b. Chester, 22 March 1846; d. Saint Augustine, Florida, 12 Feb. 1886. He entered a bank at Whitechurch, and was afterward transferred to Manchester, but ultimately gave up banking for art. His first success was the publication, in 1875, of his illustrations of a volume of selections from Washington Irving's 'Sketch Book,' under the title of 'Old Christmas.' It was followed by his illustrations of the same author's 'Bracebridge Hall' (1876); Mrs. Carr's 'North Italian Folk' (1877); Blackburn's 'Breton Folk' (1879); and Æsop's 'Fables' with Modern Instances' (1883). His most popular work, however, was the series of colored books for children commenced by him in 1878, and including 'John Gilpin,' the 'Elegy

on the Death of a Mad Dog,' and the 'Great Panjandrum.'

Caldera, kal-dá'ra, Chile, a sea-port 50 miles northwest of Copiapó, to which there is a railway. It has risen as an outlet for the produce of the rich copper mines in the interior, with which it is connected by rail. The town is well laid out and has some handsome houses and buildings. A mole has been formed in the harbor. The population is less than 2,000, but its trade is sufficient to make it the seat of a United States consulate.

Calderari ("kettle-" or "boiler-makers"), a secret society which sprang up in Naples on the restoration of the Bourbons. The Calderari were, according to some accounts, an off-shoot from the Carbonari, a society which had in view the political union of Italy and its liberation from foreign dominion. They appear to have separated from the parent society about 1813, and soon exhibited the most violent antipathy to it. On the restoration of Ferdinand IV., Prince Canosa, the minister of police, attempted to organize them under government patronage as a counterpoise to other secret societies, and particularly the Carbonari. The attempt led to various scenes of violence. It was abandoned and the minister dismissed in June 1816, after he had been six months in office.

Calderon, Francisco Garcia, Peruvian statesman: b. Arequipa, 1834. At the age of 21 he was a professor of jurisprudence, a member of the Peruvian Congress 1867, and minister of the treasury 1868. After the occupation of Lima by the Chilean army, during the war between Chile, Peru, and Bolivia, 1879-81, he was made president of a provisional government formed under the protection of the Chilean authorities, February 1881. He pledged himself to conduct his government upon principles not opposed to the fundamental conditions demanded by Chile for the final arrangement of peace, but failing to do this, he was arrested, 6 Nov. 1881, by order of Gen. Patrick Lynch, rear-admiral and general-in-chief of the Chileans, and sent as a prisoner to Valparaiso. Upon his return to Lima in 1886 he was elected president of the senate. His principal work is a 'Dictionary of Peruvian Legislation.'

Calderon, Manuel Alvarez, mã'noo-ël ä'l bã rêth, Peruvian lawyer and diplomatist: b. Lima, Peru, 2 June 1852. He was graduated from the University of San Marcos, Lima. He is a member of the Illustrious College of Lawyers at Lima, has been professor of the science of finance at this university, and from 14 July 1900 has been minister plenipotentiary from Peru to the United States.

Calderon, kâl'dér-ôn, Philip Hermogenes, English painter, of Spanish parentage: b. Poitiers, 3 May 1833; d. London, 30 April 1898. He was the son of Juan Calderon, at one time professor of Spanish literature in King's College, London. Coming to England about 1845, he became shortly afterward the pupil of a civil engineer; but his artistic ability was so pronounced that his father allowed him to devote himself to the study of art at the British Museum and the National Gallery. In 1853 he went to study under Picot at the École des Beaux Arts in Paris. He first exhibited at the

Academy in 1853, his picture being named 'By the Waters of Babylon.' Among the many pictures he subsequently produced are: 'Broken Vows' (1857); 'Far Away' (1858); 'The Gaoler's Daughter' (1858); 'Never More' (1860); 'Liberating Prisoners on the Young Heir's Birthday' (1861); 'After the Battle' (1862), one of his most successful works; 'The English Embassy in Paris on the Day of the Massacre of St. Bartholomew' (1863); 'Her Most High, Noble, and Puissant Grace' (1865), the last two being probably his finest works; 'Whither?' (1867—his diploma picture); 'Sighing His Soul Out in His Lady's Face' (1869); 'Spring Driving Away Winter' (1870); 'On Her Way to the Throne' (1871), a sequel to his masterpiece of 1865; 'Victory' (1873); 'Half-hours with the Best Authors'; 'La Gloire de Dijon' (1878); 'Home They Brought Her Warrior Dead'; 'Aphrodite'; 'The Answer' (1897); and 'Ruth' (1897). Elected A.R.A. in 1864, he became, three years later, a full academicien. He gained in 1867 the first French gold medal awarded to an English artist.

Calderon, Serafin Estebanez, sër-ä-fën' ës-tä-ba'nëth kal-dä-rön', Spanish writer: b. Malaga, Spain, 27 Dec. 1801; d. Madrid, 7 Feb. 1867. He was professor of poetry and rhetoric at Granada, 1822-30, but resigned and went to Madrid. There he collected a library of old Spanish literature, especially of ballads, whether manuscript or in print: the collection is in the National Library at Madrid. He wrote a volume of poems, 'Poesias del Solitario' (1833); a novel, 'Christians and Moriscos' (1838), and a very valuable study of 'The Literature of the Moriscos.' He also wrote 'The Conquest and the Loss of Portugal,' and a charming volume of 'Andalusian Scenes.'

Calderon de la Barca, käl'dër ön dü lä bär'ka, **Frances Erskine** (INGLIS), Scottish-American writer: b. Scotland about 1810. Her father, Mr. Inglis, was a grandson of Col. Gardiner who fell at Preston-Pans. She resided in her youth for several years in Normandy, and then emigrated with her mother to the United States, where they established a school at Boston, in which the daughter officiated as teacher for six years. In 1838 she married the Spanish minister at Washington, Don Calderon de la Barca, and afterward accompanied her husband to Mexico. In 1843 she published 'Life in Mexico,' which gained for her considerable literary reputation.

Calderon de la Barca, Pedro, pä'drō käl-dä-rön' dä lä bär'ka, Spanish dramatist: b. Madrid, 17 Jan. 1600; d. 25 May 1681. He received his early education in the Jesuits' college of his native city, and studied at Salamanca, where he devoted himself chiefly to history, philosophy, and jurisprudence. His poetical genius early discovered itself. Before his 14th year he had written his third play, 'El Carro del Cielo.' His talent for this species of poetry, which has brought his name down to posterity, and perhaps his powers of invention in the preparation of entertainments for festivals, soon gained him friends and patrons. When he left Salamanca in 1625, to seek employment at the court of Madrid, many noblemen interested themselves in bringing forward the young poet. But having an inclination

for the military profession, he entered the service in 1625, and bore arms with distinction for 10 years in Milan and the Netherlands. From these countries, it has been observed, he usually drew his heroes of comedy. In 1636 he was recalled by Philip IV., who gave him the direction of the court entertainments, and, in particular, the preparation of plays for the court theatre. The next year he was made knight of the order of Santiago, and he served in 1640 in the campaign in Catalonia. The unexpected termination of the war restored him again to his peaceful occupation. The king now conferred on him a monthly pension of 30 *escudos de oro*; but he still employed his talents with unintermitted industry in composing for the theatre and the Church. The king spared no cost in the representation of his theatrical pieces. Ten years after, in 1651, he procured permission from the order of Santiago to enter the clerical profession, and in 1653 obtained a chaplain's office in the archiepiscopal church at Toledo, without quitting, however, his former occupation. But as this situation removed him too far from court, he received, in 1663, another at the king's court chapel (being still allowed to hold the former); and at the same time a pension was assigned him from the Sicilian revenue. His fame greatly increased his income, as he was solicited by the principal cities of Spain to compose their *autos sacramentales*, for which he was liberally paid. He bestowed particular pains on the composition of these pieces, and in fact, eclipsed all that the Spanish literature, so rich in this department of fancy, had hitherto produced. These subjects were particularly suited to his religious turn of mind; and he set a peculiar value on his performances of this kind, so as even to disparage his other works, which deserve no mean reputation. Religion is the ruling idea, the central point, of his poems. Whatever subject he handles he exhibits true poetical genius. Even allowing that he is inferior in richness of invention to Lope de Vega, he certainly excels him in fineness of execution, elevation of feeling, and aptness of expression. If we find in him much that is foreign to our modes of thinking and feeling, to our accustomed views and manner of expression, we shall have occasion much oftener to admire his unrivaled genius. The Spanish nation esteem Calderon among the greatest poetical geniuses. Among his dramatic works are many pieces of intrigue, full of complicated plots and rich in interesting incidents. There are, besides, heroic comedies and historical plays, some of which merit the name of tragedies. To this class belongs the 'Constant Prince,' which deserves an honorable place among romantic tragedies of the first rank. Besides these, Calderon has left 95 *autos sacramentales*, 200 *loas* (preludes), and 100 *saynetes* (farces). He wrote his last play in the 80th year of his age. The smaller poems of Calderon, his songs, sonnets, ballads, etc., notwithstanding the applause which they received from his contemporaries, are now forgotten; but his plays have maintained their place on the stage, even more than those of Lope de Vega. The number of his collected plays amounts to 128. He wrote, however, many more, some of which were never published. The most complete edition of his works is that published by D. Juan de Vera Tassis y Villarroel (Madrid 1685, 9

vols.). 'The Constant Prince' shows, perhaps, in the highest degree, Calderon's tragic powers. It turns on one of the most perplexing of all subjects, that is, the idea of destiny, managed in a truly poetical way, in a tragedy terminating happily. The great fertility of Calderon's invention has heaped up an abundance of materials from which foreign theatres might be much enriched. It is to be regretted that his works have not been chronologically arranged. We might then have traced the growth of mysticism in his mind, and seen it striking root more deeply as he advanced in life. At the age of 62 he was admitted into the fraternity of San Pedro. Before his death he was elected their *capellán mayor*. He left them all his property, for which they erected a splendid monument to his memory. Among his imitators, Tirso de Molina is worthy of mention, as the author of the 'Inflexible Stranger,' which has been often imitated. He also found imitators among his rivals in other countries. Corneille and Molière are believed to have built some of their renowned productions upon the foundations he had provided. See Schmidt, 'Die Schauspiele Calderons' (1857); Trench, 'Essay on the Life and Genius of Calderon' (1880); Menendez y Pelayo, 'Calderon y su teatro' (1881); Günther, 'Calderon und seine Werke' (1888).

Calderon y Beltran, ē bēl-trān', **Fernando**, Mexican dramatist and poet: b. Guadalajara, 20 July 1809; d. Ojocaliente, 18 Jan. 1845. Throughout Spanish America his plays, such as 'The Journey,' 'Anne Boleyn,' and 'The Return of the Crusader,' have been extremely popular, and as a lyrist he is much admired by the Mexican public.

Calderwood, kōl'dēr-wūd, **David**, Scottish clergyman and ecclesiastical historian: b. Dalkeith, 1575; d. Jedburgh, 29 Oct. 1650. In 1604 he was settled as a minister of Crailing, in Roxburghshire, where he distinguished himself by his opposition to episcopal authority. In 1617 he was banished from the realm for his contumacy, and went to Holland, where, in 1623, he published his famous work entitled 'Altare Damascenum.' Some time afterward he returned to Scotland, and became minister of the church of Pencaitland, near Edinburgh. He then engaged in writing the history of the Church of Scotland, in continuation of that of Knox, a work which was published from his manuscript in 1842-9 in eight volumes.

Calderwood, Henry, Scottish philosopher: b. Peebles, 10 May 1830; d. Edinburgh, 19 Nov. 1897. He received his early education at the Edinburgh Institution and High School. He afterward attended the university of that city, and while a student published his 'Philosophy of the Infinite' (1854), an attempt to controvert the views of Sir William Hamilton. He became minister of Greyfriars United Presbyterian Church, Glasgow, in 1856, and in 1868 was elected professor of moral philosophy in Edinburgh University, a chair which he occupied for the rest of his life. His chief works are his 'Handbook of Moral Philosophy' (1872); 'Relations of Mind and Brain' (1881); and 'Evolution and Man's Place in Nature' (1893).

Caldicott, kōl'dī kōt, **Alfred James**, English musician and composer: b. Worcester, England, 1842; d. 24 Oct. 1897. After studying at

Leipsic under Richter and Moscheles he was organist of Saint Stephen's Church in his native town for a time, becoming professor in the Royal College of Music in 1882. Among his works, beside many songs, glees, etc., are the cantatas 'The Widow of Nain' (1881); and 'A Rhine Legend' (1883); and the operettas, 'A Moss Rose Pent' (1883); and 'Old Knockles' (1884).

Caldwell, Alexander, American banker: b. Drake's Ferry, Huntington County, Pa., 1 March 1830. He attended public and private schools until 16 years of age. In 1847 he enlisted as a soldier in the Mexican war, entering the company of his father, who was killed at one of the gates of the city of Mexico. In 1848 he returned to Columbia, Pa., where he entered a bank, and later took up business. In 1861 he removed to Kansas, where he engaged in the transportation of military supplies to the various posts on the plains, and became largely interested in railroad and bridge building. He was elected to the United States Senate as a Republican, took his seat 4 March 1871, and served until 24 March 1873, when he resigned.

Caldwell, kōld'wēl, **Charles**, American physician: b. Caswell County, N. C., 14 May 1772; d. Louisville, Ky., 9 July 1853. He studied medicine at Philadelphia, and in 1795 translated from the Latin, Blumenbach's 'Elements of Physiology.' He published also a 'Life of General Greene' (1819), a work on mesmerism, and other volumes. In 1819 he became professor of the institutes of medicine in Transylvania University, Lexington, Ky. He subsequently founded a medical school in Louisville.

Caldwell, Charles Henry Bromedge, American naval officer: b. Hingham, Mass., 11 June 1828; d. Boston, 30 Nov. 1877. He did a notable service in an expedition against a tribe of cannibals inhabiting one of the Fiji Islands, defeating them in a pitched battle and destroying their town. In the Civil War he commanded the Itasca, taking part in the bombardment of forts Jackson and St. Philip and the Chalmette batteries, and in the capture of New Orleans. He was promoted commodore in 1874.

Caldwell, Howard Walter, American historian: b. Bryan, Ohio, 26 Aug. 1858. He was graduated from the University of Nebraska in 1880 and is professor of American history and jurisprudence there. He has written 'History of the United States, 1815-1861' (1896); 'Studies in History' (1897); 'A Survey of American History' (1898); 'Some Great American Legislators' (1899); 'Life of Henry Clay' (1899); 'Expansion of the United States' (1900).

Caldwell, James, American clergyman: b. Charlotte County, Va., April 1734; d. 24 Nov. 1781. After graduating at the College of New Jersey, now Princeton University, he became Presbyterian pastor at Elizabethtown. During the growing antagonism between the colonies and Great Britain, he warmly took the side of the former, and when hostilities began, became chaplain to the New Jersey brigade, and took an active share in its campaigns, fighting "with the sword in one hand and the Bible in the other." Irritated at the unexpected and obstinate resistance made by the Jersey troops and

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yeomanry, the English began to burn the houses and pillage the property of the villagers at Connecticut Farms. In one of the houses was the family of Mr. Caldwell, whose wife had retired to a back room with her two youngest children—one an infant in her arms—where she was engaged in prayer, when a musket was discharged through the window. Two balls struck her in the breast, and she fell dead upon the floor. On 23 June Gen. Knyphausen made a second incursion with about 5,000 troops. On this occasion he passed over the same route to Springfield, where a battle was fought. Among the most active in the fight was the chaplain Caldwell. There is a tradition, well authenticated, that in the hottest period of the action the wadding of a portion of the Jersey infantry gave out, which fact being communicated to Caldwell, he rode to the Presbyterian Church, and hastily collecting the psalm and hymn books which were in the building, he distributed them to the soldiers with the exhortation, "Now put Watts into them, boys!" The British were finally compelled to retrace their steps, which they did with all possible rapidity. He was shot and killed by an American sentinel in the course of a dispute over a package the latter desired to examine. Sixty-four years after Caldwell's death a monument was raised to his memory in Elizabeth.

Caldwell, Merritt, American educator: b. Helron, Me., 29 Nov. 1806; d. Portland, Me., 6 June 1848. He was graduated from Bowdoin College in 1828 and was subsequently professor of mathematics and English literature in Dickinson College, Pa. He published 'Manual of Elocution' (1846); 'Philosophy of Christian Perfection' (1847); 'Christianity Tested by Eminent Men'; 'The Doctrine of the English Verb.'

Caldwell, Samuel Lunt, American Baptist clergyman: b. Newburyport, Mass., 13 Nov. 1820; d. Providence, R. I., 26 Sept. 1889. After studying at the Newton (Mass.) Theological Institution he entered the ministry and was successively pastor at Bangor, Me., 1846-58; and of the First Baptist Church in Providence 1858-73; professor of Church history in the Newton Theological Institution 1873-8; and president of Vassar College 1878-85.

Caldwell, William, Scottish-American educator: b. Edinburgh, Scotland, 10 Nov. 1863. He was graduated from the university of his native city and was assistant professor of logic and metaphysics in that institution 1887-8. In 1891 he was called to the Sage School of Philosophy, Cornell University, N. Y.; in 1892 to the University of Chicago, and since 1894 has been professor of moral and social philosophy in the Northwestern University at Evanston, Ill. He has published 'Schopenhauer's System in Its Philosophical Significance.'

Caleb, son of Jephunneh, a descendant of the tribe of Judah, or according to some authorities a foreigner of Kenezite origin incorporated with that tribe, according to Ussher born 1530 B.C. was sent with Joshua and 10 others to examine the land of Canaan. When Joshua had conquered the country, Caleb reminded the Jews of the promise which had been made by God, that they should enjoy this country. He obtained the city of Hebron for his share of the

spoil, besieged and captured it, and drove out three giants, or Anakim. He then marched against Kirjath-sepher, and offered his daughter Achsah to the first who should enter it. Othniel, his nephew, was the successful aspirant for the fair Jewess.

Caleb Williams, a novel by William Godwin (1794), a curious, rambling, half sensational and half psychological story. It met with immediate popularity, and furnished the suggestion of the well-known play 'The Iron Chest.'

Caledonia, the name by which the northern portion of Scotland first became known to the Romans. The year 80 of the Christian era is the period when Scotland first becomes known to history. The invasion of Cæsar did not immediately lead to the permanent occupation of southern Britain. It was only in the year 43 that the annexation of this portion of the island to the Roman empire began. It was completed superficially about 78, and two years were occupied in reconciling the natives to the Roman yoke. Agricola then moved northward, invading Scotland by the eastern route, and occupying the country up to the line of the Friths of Clyde and Forth. Agricola ran defensive works across this line, and hearing, in the third year of his occupation, rumors of an organized invasion in preparation by the Caledonians, a name applied to the dwellers north of the boundary, he resolved to anticipate them, and again advanced northward. The Roman army marched in three divisions. The weakest, consisting of the ninth legion, was attacked by the barbarians, who fought their way to the Roman camp. Agricola came to the rescue, and the Romans were victorious. The Roman army now advanced to Mons Grampius, where they found the enemy, 30,000 strong, under a chief named Galgacus. Agricola had to stretch his line as far as he deemed prudent to prevent being outflanked. The auxiliaries and Romanized Britons were in the centre and front, the legions in the rear. The Caledonians are described as riding furiously about in chariots between the two camps. Each chief (Roman and Caledonian) made a set speech to his followers; that of Galgacus was peculiarly eloquent. The Caledonians were armed with small shields, arrows, and large pointless swords. Their chariots routed the Roman cavalry, but afterward became embarrassed in the broken ground; and when the Roman auxiliaries charged the masses of the enemy with the gladius, they gave way before a method of fighting to which they were unaccustomed. Some further manœuvres occurred, but the victory of the Romans was complete. It does not appear, however, to have been productive of great effects, as next morning the enemy had entirely disappeared. Such is the account given by Tacitus of the only one of the numerous battles between the Romans and the Caledonians, of which we have a detailed description. The site of the battle remains undetermined, and the origin of the name Caledonian remains in equal obscurity. Various derivations are given of the word, but whether it was a native term, and to what exact people it applied, cannot with certainty be determined. The name Caledonian is first used by Pliny, who, as well as Tacitus, is supposed to have derived it from Agricola. The name is applied by Ptolemy to one of the numerous

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populations of North Britain. The use of the name by Tacitus gave it immediate popularity with the Romans, and to the same source its subsequent popularity in Britain is to be traced. Its historical importance is therefore exclusively limited to this first mention of it. See Dr. Smith, 'Dictionary of Greek and Roman Geography,' and Burton, 'History of Scotland.'

Caledonian Canal, in Scotland, counties of Inverness and Argyle, connects the North with the Irish Sea, extending from Murray Frith through Lochs Ness, Oich, and Lochy, in the great glen of Caledonia, to Loch Eil. The total length is 60½ miles, of which the lochs compose 37½. The canal was begun in 1803, and opened for navigation about the close of 1823.

Calef, Robert, American merchant of Boston: b. about 1648; d. Roxbury, Mass., 13 April 1719. His fourth son, also named Robert, died in 1722 or 1723, aged about 41. One or the other of these men was the author of a remarkable book on the witchcraft delusion in New England. The best authorities, notably James Savage and Wm. F. Poole, ascribe it to the younger, who was about 23 when it appeared. The book was entitled 'More Wonders of the Invisible World' (Lond. 1700), the title being suggested by Cotton Mather's 'Wonders of the Invisible World.' The substance of it had been circulated in manuscript several years previous to its publication and its malicious attacks on Cotton and Increase Mather caused a bitter and life-long quarrel between the former and the author. The book abounds in malicious innuendos, directly charges the Mathers with inciting and being in full sympathy with the Salem tragedies, and accuses the Boston ministers, in their advice of 15 June 1692, of endorsing the Salem methods. When the book was printed and came back to Boston it was denounced and hated because it was an untruthful and atrocious libel on the public sentiment of Boston, and on the conduct of its ministers. It is said that Increase Mather publicly burned it in the Harvard College yard. The animus of the book has been greatly misunderstood, and the popular idea that Calef was a stalwart agent in putting an end to Salem witchcraft is both a myth and a delusion. Its historical value and the author's character have been greatly overrated. His personal history is a blank which the most assiduous investigation has never been able to fill, or even to supply with the most common details. It is not known where or when he was born, when he died, or where he was buried, although he lived in Boston and his will is on file in the Suffolk records. His book has now become very rare and copies bring high prices in the book auctions. It was reprinted at Salem in 1796, 1823, and 1861, and at Boston in 1828 and 1865.

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Calendar, a systematic division of time into years, months, weeks, and days, or a register of these or similar divisions. Among the old Romans, for want of such a register, it was the custom for the *Pontifex Maximus*, on the first day of the month, to proclaim (*calare*) the month, with the festivals occurring in it, and the time of new moon. Hence, *calendæ* (the first of the month) and *calendar*. The

periodical occurrence of certain natural phenomena gave rise to the first division of time. The apparent daily revolution of the starry heavens and the sun about the earth occasioned the division into days. The time at which a day begins and ends has been differently fixed; the reckoning being from sunrise to sunrise, from sunset to sunset, from noon to noon, or from midnight to midnight. The day adopted for all civil purposes is the *mean solar day*, because the true solar day is a constantly varying quantity. The difference between the two days is, however, so slight as to be inappreciable to ordinary observation. The changes of the moon, which were observed to recur every 29 or 30 days, suggested the division into months, but the month now used, though nearly equal to a lunation, is really an arbitrary unit; and as a still longer measure of time was found necessary for many purposes, it was supplied by the apparent yearly revolution of the sun round the earth in the ecliptic. The time of this revolution has been finally determined to be 365 days, 5 hours, 48 minutes, and 50 seconds, but as it has at various times been reckoned differently, this has given rise to corresponding changes in the calendar. This division of time is called a solar year. The division into weeks, which has been almost universally adopted, is not founded on any natural phenomenon, and, as it originated in the East, it has been attributed to the divine command to Moses in regard to the observation of the seventh day as a day of rest. By other authorities it has been ascribed to the number of the principal planets, a theory supported by the names given to the days. It was not used by the Greeks, nor by the Romans till the time of Theodosius. The great influence of the sun's course upon the seasons has naturally attracted the attention of men at all periods to this phenomenon; accordingly all nations in any degree civilized have adopted the year as the largest measure of time. The year of the ancient Egyptians was based on the changes of the seasons alone, without reference to the lunar month, and contained 365 days, which were divided into 12 months of 30 days each, with five supplementary days at the end of the year. The Jewish year consisted of lunar months, of which they reckoned 12 in the year, intercalating a 13th when necessary to maintain the correspondence of the particular months with the regular recurrence of the seasons. The Greeks in the earliest period also reckoned by lunar and intercalary months. They divided the month into three decades, a system also adopted long afterward at the time of the French Revolution. It possesses the advantage of making the smaller division an exact measure of the larger, and under it the number of a day in the 10-day period readily suggests its number in the month. The Greeks of the time of Solon had a year of 12 months alternately of 29 and 30 days, the total number of days being 354, and the year being very nearly equal to a lunar one. Soon afterward a month of 30 days began to be intercalated every other year in order to reconcile their year with that founded on the sun's movement, but as the error was still very large the intercalary month was afterward omitted once in four times. The Jewish and also the Greek year thus both varied in duration according as the intercalary month was introduced or omitted.

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This, with the uncertainty as to the exact duration of the year, was a constant source of confusion.

Various plans for the reformation of the calendar were proposed from time to time; but all proved insufficient till Meton and Euctemon finally succeeded in bringing it to a much greater degree of accuracy by fixing on the period of 19 years, in which time the new moons return upon the same days of the year as before (as 19 solar years are very nearly equal to 235 lunations). (See CYCLE.) This mode of computation, first adopted by the Greeks about 432 B.C., was so much approved of that it was engraven with golden letters on a tablet at Athens. Hence the number showing what year of the moon's cycle any given year is called the golden number. This period of 19 years was found, however, to be about six hours too long. This defect Calippus, about 102 years later, endeavored to remedy, but still failed to make the beginning of the seasons return on the same fixed day of the year.

The Romans at first divided the year into 10 months, but they early adopted the Greek method of lunar and intercalary months, making the lunar year consist of 354, and afterward of 355 days, leaving 10 or 11 days and a fraction to be supplied by the intercalary division. This arrangement, which was placed under the charge of the pontiffs, continued till the time of Cæsar. The first day of the month was called the calends. In March, May, July, and October, the 15th, in other months the 13th, was called the ides. The ninth day before the ides (reckoning inclusive) was called the nones. The other days of the month they reckoned forward to the next calends, nones, or ides, whether in the same or the succeeding month, always including both days in the reckoning. Thus the 3d of March, according to the Roman reckoning, would be the fifth day before the nones, which in that month fall upon the 7th. The 8th of January, in which month the nones happen on the 5th, and the ides on the 13th, was called the 6th before the ides of January. Finally, to express any of the days after the ides, they reckon in a similar manner from the calends of the following month. From the inaccuracy of the Roman method of reckoning it appears that in Cicero's time the calendar brought the vernal equinox almost two months later than it ought to be. To check this irregularity Julius Cæsar invited the Greek astronomer Sosigenes to Rome, who, with the assistance of Marcus Fabius, invented that mode of reckoning which, after him who introduced it into use, has been called the Julian calendar. The chief improvement consisted in restoring the equinox to its proper place in March. For this purpose two months were inserted between November and December, so that the year 707 (46 B.C.), called from this circumstance the year of confusion, contained 14 months. In the number of days the Greek computation was adopted, which made it 365¼. The number and names of the months were kept unaltered with the exception of Quintilis, which was henceforth called, in honor of the author of the improvement, Julius. To dispose of the quarter of a day it was determined to intercalate a day every fourth year between the 23d and 24th of February. This was called an intercalary day, and the year in which it took place

was called an intercalary year, or, as we term it, a leap year.

This calendar continued in use among the Romans until the fall of the empire, and throughout Christendom till 1582. The festivals of the Christian Church were determined by it. With regard to Easter, however, it was necessary to have reference to the course of the moon. The Jews celebrated Easter (that is, the Passover) on the 14th of the month Nisan (or March); the Christians in the same month, but always on a Sunday. Now, as the Easter of the Christians sometimes coincided with the Passover of the Jews, and it was thought unchristian to celebrate so important a festival at the same time as the Jews did, it was resolved at the Council of Nice, 325 A.D., that from that time Easter should be solemnized on the Sunday following the first full moon after the vernal equinox, which was then supposed to take place on 21 March. As the course of the moon was thus made the foundation for determining the time of Easter, the lunar cycle of Meton was taken for this purpose; according to which the year contains 365¼ days, and the new moons, after a period of 19 years, return on the same days as before. The inaccuracy of this combination of the Julian year and the lunar cycle must have soon discovered itself on a comparison with the true time of the commencement of the equinoxes, since the received length of 365¼ days exceeds the true by about 11 minutes; so that, for every such Julian year the equinox receded 11 minutes, or a day in about 130 years. In consequence of this, in the 16th century, the vernal equinox had changed its place in the calendar from the 21st to the 10th; that is, it really took place on the 10th instead of the 21st, on which it was placed in the calendar.

Luigi Lilio Ghiraldi, frequently called Aloysius Lilius, a physician of Verona, projected a plan for amending the calendar, which, after his death, was presented by his brother to Pope Gregory XIII. To carry it into execution, the Pope assembled a number of prelates and learned men. In 1577 the proposed change was adopted by all the Catholic princes; and in 1582 Gregory issued a brief abolishing the Julian calendar in all Catholic countries, and introducing in its stead the one now in use, under the name of the Gregorian or reformed calendar, or the new style, as the other was now called the old style. The amendment ordered was this, 10 days were to be dropped after 4 Oct. 1582, and the 15th was reckoned immediately after the 4th. Every 100th year, which by the old style was to have been a leap year, was now to be a common year, the fourth excepted; that is, 1600 was to remain a leap year, but 1700, 1800, 1900 to be of the common length, and 2,000 a leap year again. In this calendar the length of the solar year was taken to be 365 days 5 hours, 49 minutes, and 12 seconds, the difference between which and subsequent observations is immaterial. In Spain, Portugal, and the greater part of Italy, the amendment was introduced according to the Pope's instructions. In France the 10 days were dropped in December, the 10th being called the 20th. In Catholic Switzerland, Germany, and the Netherlands the change was introduced in the following year, in Poland in 1586, in

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Hungary 1587. Protestant Germany, Holland, and Denmark accepted it in 1700, and Switzerland in 1701. In the German empire a difference still remained for a considerable time as to the period for observing Easter. In England the Gregorian calendar was adopted in 1752, in accordance with an act of Parliament passed the previous year, the day after 2 September becoming the 14th. Sweden followed in 1753. The change adopted in the English calendar in 1752 embraced another point. There had been previous to this time various periods fixed for the commencement of the year in various countries of Europe. In France, from the time of Charles IX., the year was reckoned to begin from 1 January; this was also the popular reckoning in England, but the legal and ecclesiastical year began on 25 March. The 1st of January was now adopted as the beginning of the legal year, and it was customary for some time to give two dates for the period intervening between 1 January and 25 March, that of the old and that of the new year, as January 1753. Russia alone retains the old style, which now differs 12 days from the new; but has it in contemplation to adopt the Gregorian calendar at an early date.

In France, during the revolutionary epoch, a new calendar was introduced by a decree of the National Convention, 24 Nov. 1793. The new reckoning was to begin with 22 Sept. 1792, the day on which the first decree of the new republic had been promulgated. The year was made to consist of 12 months of 30 days each, and, to complete the full number, five *fête* days (in leap year six) were added at the end of the year. Instead of weeks, each month was divided into three parts, called decades, consisting of 10 days each; the other divisions being also accommodated to the decimal system. The names of the months were so chosen as to indicate, by their etymology, the time of year to which they belonged. They were as follows:

AUTUMN (September 22 to December 22):

Vendémiaire (vintage month), October
Brumaire (foggy month), November
Frimaire (sleet month), December

WINTER (December 22 to March 22):

Nivôse (snowy month), January
Pluviôse (rainy month), February
Ventôse (windy month), March

SPRING (March 22 to June 22):

Germinal (bud month), April
Floréal (flower month), May
Prairial (meadow month), June

SUMMER (June 22 to September 22):

Messidor (harvest month), July
Thermidor (hot month), August
Fructidor (fruit month), September

The 10 days of each decade were called:

1 Primidi	4 Quartidi	7 Septidi
2 Duodi	5 Quintidi	8 Octidi
3 Tridi	6 Sextidi	9 Nonidi
10 Decadi, the Sabbath		

This calendar was abolished at the command of Napoleon, by a decree of the senate, 9 Sept. 1805, and the common or Gregorian calendar was re-established on 1 January of the following year. Of calendars projected since then we may mention that put forward by Auguste Comte in 1849, by which a separate name is given to every day in the year, while the months and weeks have also particular

names, all arranged upon a principle of hero-worship. Moses, Homer, Aristotle, Shakespeare, Descartes, Cæsar, St. Paul, etc., are honored with months, while minor individuals, such as Ulysses, Romulus, Socrates, and Plato, have days assigned to them. See also CHRONOLOGY; CYCLE; EPOCH.

Calendar, French Revolutionary. See CALENDAR.

Calender, an apparatus or machine consisting of cylinders or rollers, often heated, by means of which different fabrics are subjected to great pressure, the object being to make them smooth and glossy, to glaze them, to water them, or give them a wavy appearance, and thus fit them for the market.

Calendering. See PAPER-MAKING MACHINERY.

Cal'enders, a sect of dervishes in Turkey, Persia, etc. They are not very strict in their morals, nor in very high esteem among the Mohammedans. They preach in the market-places and live upon alms. See DERVISH.

Calends, with the Romans, the name given to the first day of each month, used in fixing dates, as explained in the article Calendar (q.v.). The Greeks did not make use of calends in reckoning, whence the Roman proverbial expression *ad Græcas calendas* (on the Greek calends), meaning "never." The calends of January were more solemn than the others.

Calendula, or **Marigold**, a plant (*Calendula officinalis*) of the daisy family (*Compositæ*), whose florets are used in medicine as a tonic.

Cal'enture, a kind of feverish delirium, incident to persons in hot climates, and especially liable to attack them on board ships. It is said that the patient imagines the sea to be a green field, in which he is tempted to walk by the coolness and freshness of its appearance. But we seldom in these days hear of persons being afflicted in such a manner, although the term is sometimes used to designate the Cuban fever.

Calenzio, kă-lents'ê-ô, or **Calentius**, **Eliseo**, êl-ê-să'ô, Neapolitan poet: d. 1503. He published numerous writings in prose and verse, elegies, epigrams, satires, fables, and epistles, which were issued under the title of 'Opuscula,' and also wrote upon penal legislation, and is said to have been the first to propose the restriction of capital punishment to the crime of murder.

Cal'gary, Canada, capital of the district of Alberta, on the Bow River, about 840 miles west of Winnipeg. It is on the Canadian P. Ry., at the junction of the line running north to Edmonton and south to Fort Macleod. There are various churches, a public and a convent school, a court-house, hospitals, etc., and various manufactures have been established. It is the centre of an important cattle- and horse-ranching district. Good building stone is quarried in the neighborhood. Calgary has grown up since 1880. Pop. (1902) 5,600.

Calhoun, kăl-hoon', **John Caldwell**, American statesman: b. Abbeville District, S. C., 18 March 1782; d. Washington, D. C., 31 March 1850. He was graduated with distinction at Yale College in 1804, and was admitted to the South Carolina bar in 1807. After serving for two sessions in the legislature of his native

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State, he was elected to Congress in 1811. From that time until his death, a period of nearly 40 years, he was seldom absent from Washington, being nearly the whole time in the public service, either in Congress or in the Cabinet. When he first entered Congress the disputes with England were fast approaching actual hostilities, and he immediately took part with that portion of the dominant party whose object was to drive the still reluctant Administration into a declaration of war. They succeeded, and, as a member of the Committee on Foreign Relations, he reported a bill for declaring war, which was passed in June 1812. When Monroe formed his administration in 1817, Calhoun became secretary of war, a post which he filled with great ability for seven years, reducing the affairs of the department from a state of great confusion to simplicity and order.

In 1824 he was chosen Vice-President of the United States under John Q. Adams, and again in 1828 under Gen. Jackson.

In 1828, a protective tariff was enacted which bore very heavily on the agriculturists of the South and hence was known throughout that section as "The Tariff of Abominations." Mr. Calhoun prepared a paper declaring that the "United States is not a union of the people, but a league or compact between sovereign states, any of which has the right to judge when the compact is broken and to pronounce any law to be null and void which violates its conditions." This paper was issued by the legislature of South Carolina and was known as the "The South Carolina Exposition." This view of the United States Constitution as a compact between the States had been many years before strongly expressed in the Virginia and Kentucky resolutions, the former being drawn up by James Madison, often styled the "Father of the Constitution," and the latter by Thomas Jefferson. The Kentucky resolutions had suggested nullification as a remedy. Alexander Hamilton in "The Federalist" frequently spoke of the United States as a "Confederate Republic" and a "Confederacy" and called the Constitution a "compact." Washington frequently referred to the Constitution as a "compact," and spoke of the Union as a "Confederated Republic." At the time of the Louisiana Purchase Hon. Timothy Pickering of Massachusetts advocated the right and advisability of secession and Hon. Josiah Quincy of the same State in 1811 expressed similar views. Hence John C. Calhoun propounded no new or strange doctrine, but one which had found advocates before, and in the North as well as in the South.

In 1828, the friendly relations between Mr. Calhoun and President Jackson were broken off, when the latter ascertained that Calhoun had sought to have him called to account for his acts in the Seminole War. This breach was still further enlarged when Calhoun refused to co-operate with President Jackson in the effort to reinstate Mrs. Eaton in Washington society.

When Mr. Calhoun found that the repeal of the tariff of 1828 could not be secured through President Jackson, he resigned the Vice-Presidency and entered the Senate from South Carolina. On 26 July 1831 he published a paper *favoring free trade and declaring that the*

"great conservative principle of Union is nullification." The tariff question was settled by a compromise in 1832.

Mr. Calhoun feared that the slavery quarrel would some day disrupt the Union and therefore endeavored to check all discussion of this issue. He opposed Jackson's removal of the funds from the National Bank and also assailed the "spoils system." He supported Van Buren's "sub-treasury system," favored his re-election and secured for him the electoral vote of South Carolina. He defended Tyler for vetoing the recharter of the United States Bank and as Secretary of State under that President was largely instrumental in bringing about the annexation of Texas. He regretted the division of the Union into sections, but, recognizing a fact which already existed, he advocated a dual executive, one from the North, the other from the South, each having the power to veto an act approved by the other; thus preventing the passage of any law offensive to either section. His motive in this was the preservation of the Union, which he dearly loved.

He died 31 March 1850, having spent the last few months of his life in writing his "Discussion on Government" and his "Discussion on the Constitution and Government of the United States" which has been pronounced the most remarkable discussion of the rights of minorities ever written.

Mr. Calhoun was of attractive personality and of irreproachable character, to which Daniel Webster testified in his grand eulogy on the great South Carolinian.

His 'Collected Works' appeared 1853-4, and his correspondence, edited by Jameson, in 1900. See lives by Jenkins (1851); Von Holst (1882); Benton, 'Thirty Years' View' (1854).

J. T. DERRY,

Author History of Georgia.

Calico printing, the art of producing on calico or cotton cloth variegated patterns by the process of printing; the object, as a rule, being to have the colors composing the designs as fast as possible to washing and other influences. It is similar to the art of dyeing, but differs from it in so far that the coloring matters are fixed on certain parts of the fabric only, to form a pattern. Linen, wool, and silk fabrics are printed in a similar manner, but less extensively. The origin of the art of printing is probably coeval with that of dyeing (qv). India is generally regarded as the birthplace of calico-printing, and the word calico is derived from the name of the Indian town Calicut, where it was at one time extensively manufactured and printed. Calico-printing, as an Egyptian art, was first described by Pliny in the 1st century. Indian printed chintz calicoes were introduced into Europe by the Dutch East India Company, and the first attempts at imitating them in Europe are said to have been made in Holland, but at what exact date is uncertain. The art, however, soon spread to Germany and England, where it is said to have been introduced about 1676, two of the earliest works being situated at Richmond, on the Thames, and at Bromley Hall, Essex. In 1738 calico print-works were established in Scotland in the neighborhood of Glasgow, and in 1764 at Bamber Bridge, near Preston, in Lancashire. At the present time the chief seats of the calico-

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printing trade in Great Britain are still in the neighborhood of Glasgow and Manchester. The chief European seat of calico-printing is Mülhausen, in Germany, and it is practised in various towns in France, Austria, Russia, Switzerland, Holland, and the United States.

Calico-printing is of a highly complex character, and enlists not only the co-operation of the arts of designing, engraving, bleaching, and dyeing, but also an important element of success, the science of chemistry.

The first operation to which the gray calico is submitted, as it comes from the loom, is that of singeing. This consists in burning off the loose downy fibres from the surface by passing the pieces rapidly, in an open and stretched condition, over red-hot plates or a row of smokeless Bunsen gas flames. The object of singeing is to obtain a smooth printing surface on the calico, thus ensuring the production of clear, sharp impressions during the printing process. The next operation is that of bleaching, which consists in boiling the fabric with weak alkaline solutions, followed by a treatment with cold dilute solutions of bleaching-powder and acid, interspersed with frequent washings with water. By these means the natural impurities of the cotton are removed, and the calico ultimately presents a snow-white appearance. A number of pieces are now stitched together, wrapped on a wooden roller, and passed through a so-called shearing machine, in which, by means of a spiral cutter similar to that in a lawn-mower, any projecting knots, loose fibres, or down are finally removed. In this condition the calico is ready for the printer.

The printing of the patterns upon the cloth may be carried out in various ways, the earliest method being by means of wooden blocks, on which the figures of the patterns stood out in relief. Where several colors were employed in one pattern, a block for each color was necessary. In a set of blocks for one pattern, each block, although at first having the same design drawn upon it, was cut in such a manner that it ultimately transferred only a single color, which appeared in different parts of the pattern. When all the blocks had been applied, the various colors printed completed the original design. To ensure accurate juxtaposition of the colors, each block was furnished with brass points at the corners, in order to guide the workman. The printer first furnished the face of the block with the requisite color by pressing it several times on a piece of woollen cloth suitably stretched and supported on a so-called color-sieve, and which had been previously brushed over with color by a boy attendant. The printer then applied the block to the surface of the calico, which was stretched on a long table covered with felt, striking the back of the block with his hand or with a small mallet. The operation of block printing was slow and tedious and though many improvements have been introduced, and it can even be effected by mechanical power, as in the so-called Perrotine machine, it is now only employed to a very limited extent for certain special kinds of work. Another mode of printing, introduced about 1760, is by means of engraved copper-plates, but its employment is also similarly restricted.

The modern method of printing, which dates from 1785, is effected by means of engraved

copper cylinders, and this method has now practically superseded all others.

The method of engraving employed varies according to the kind of pattern to be put on the roller. In the case of very large patterns the figures are engraved by hand on the cylinders themselves with the use of the ordinary tools of the copper-plate engraver. For smaller designs, however, which are often repeated, it is usual in the first instance to engrave the pattern by hand on a very small cylinder of soft steel in intaglio, just as it will ultimately appear on the copper. This steel cylinder, which is called a die, is then tempered to a high degree of hardness, and by means of machinery is pressed against another cylinder of soft steel, on which the pattern is thus made to appear in relief. This last cylinder, called the mill, is then hardened, and, being pressed against the copper cylinder, the figures are indented and the roller is ready for use. In the first instance the original pattern of the designer has always to be reduced or enlarged, so as to repeat an exact number of times over the roller to be engraved. In order to reduce the amount of skilled labor one repeat only of the pattern is engraved on the die; the mill, which is of larger diameter, has two, three, or four repeats; while the number of repeats on the circumference of the copper cylinder is still greater. A third method of engraving, which has now largely superseded the foregoing, is that of etching, in conjunction with the pantograph system of transferring the design to the copper roller. The roller, being coated uniformly with a bituminous varnish, has the pattern traced on the varnish in the pantograph machine by a set of diamond points, and it is then submitted for a very brief period to the action of nitric acid. In the parts where the pattern has been traced the varnish is removed, there the copper is speedily attacked by the acid, and the pattern is thus etched upon it. After removing the varnish the roller is ready for printing.

The cylinder printing machine consists of a large central iron drum, around which are arranged one or more engraved copper rollers, according to the number of colors to be printed simultaneously. Each roller is provided with the means of making several adjustments, in order to determine the exact position of the color which it prints. The central drum is wrapped with cloth, and it is further provided with an endless blanket and back-cloth, so as to present a yielding surface to the printing rollers. The cloth to be printed passes from a roll behind the machine, round the central drum, in a tightly stretched condition, while the several printing rollers press forcibly against it. Each roller, as it revolves, is fed with color from a small trough below, the superfluous color being scraped off the plain surface of the roller by means of a sharp-edged steel blade, or "doctor," thus leaving the color only in the engraved portions. As the rollers thus charged with color press against the cloth, the latter absorbs or withdraws the color from the engraving, and the pattern is thus transferred to the calico. By this machine as much work can be performed in three minutes as could be done by block-printing in six hours. After the cloth has received the impression from the rollers it passes over a series of steam-heated flat iron chests, or cylinders, and is thus dried.

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In close connection with the printing-machine department is the so-called color-house or color-shop, where the solutions of coloring matters are suitably thickened and made ready for the printer. The color-house is provided with numerous steam-heated copper pans, so arranged on supports that they can be readily turned over for emptying or cleaning. The color mixtures are stirred with wooden blades by hand, or by mechanical agitators, and carefully strained through cloth before use. The thickening of the color solutions with starch, flour, gum, dextrine, albumen, etc., is necessary to prevent the spreading of the color by capillary attraction beyond the printed parts, and thus ensure sharp and neat impressions. Near the color-house is a chemical laboratory, and a drug-room containing the store of coloring matters, dyewood, extracts, thickenings, chemicals, etc.

The various classes or styles of calico-prints are usually arranged either according to the chief dyestuffs employed or their mode of application. Each of these primary styles may be further separated into subdivisions, of which the most important are the discharge and resist styles, which refer to the manner in which the pattern is produced. The following include the chief styles of calico-prints at present in vogue:

Madder Style.—This is so named because the chief dyestuff formerly employed in it was madder. This dyestuff belongs to the class of so-called mordant-colors. Such dyestuffs are worthless if employed alone by the calico-printer, and only furnish useful colors if applied in conjunction with certain metallic salts or mordants, of which the chief ones here employed are the acetates of aluminum and iron. At first the pattern is printed on the white calico with these or similar mordants alone, and only after they have been suitably fixed is the madder or other similar coloring matter applied in the dye-bath, where for the first time the desired colored pattern appears. The aluminum mordant yields red and pink, iron yields purple or black, a mixture of iron and aluminum yields chocolate, etc. The fixing of the mordant after printing and drying is effected by passing the printed calico through the so-called ageing-machine, a large chamber suitably heated and charged with moisture, where the acetic acid of the printed mordants is driven off, leaving the aluminum salt in an insoluble form on the calico. A more complete fixing of the mordant is subsequently effected by passing the fabric through solutions containing silicate or arseniate of soda, and a final washing completes its preparation for dyeing. The dyeing operation consists in boiling the fabric in a solution or decoction of the requisite dyestuff. After dyeing, the stained unprinted portions are cleaned and purified, while the printed colors are rendered more brilliant by washing, soaping, coloring, etc. Variety of effect is produced by printing the same fabric two or three times (print, cover, pad) with various designs before proceeding to the ageing, etc. If in the first instance a portion of the pattern is printed with lime-juice (citric acid), it resists or prevents the fixing of the mordants applied over it in the second and third printings, and the part remains undyed and appears as a so-called resist white. In a similar manner stannous chloride, mixed with aluminum acetate before printing, resists the fixing

of iron mordants printed over the aluminum mordant, and a resist red pattern under a purple cover is obtained, presuming madder to be the dyestuff employed. Alizarin now replaces the madder formerly used, and similar variegated effects are obtained if other mordant dyestuffs are employed, for example, cochineal, quercitron bark, etc. Formerly a preparation of madder, termed garancine, was largely employed, and gave rise to the garancine style, in which the colors were fuller and darker, the prevailing hues being browns, chocolates, drabs, etc. Since the range of colors yielded in the madder style is limited, additional colors, as green, blue, or yellow, may be printed in by block after dyeing, etc., and are fixed by steaming. If the whole fabric is evenly impregnated with mordant by means of a "padding-machine" and dried, and then a pattern is printed over the mordant with lime-juice, the mordant is removed or discharged in the printed parts, and remains white in the subsequent dyeing. Such a print would be termed a padded style with discharge white.

Steam Style.—Many coloring matters, differing from each other widely in character, are fixed by the operation of steaming instead of by dyeing, so that this style is somewhat varied in character. Ordinary steam-colors consist of a thickened mixture of dyewood extract and mordant, with the addition of assistant metallic salts and acids. The mixture is printed upon the white calico, which, after drying, is exposed from a half to one hour in closed chambers to the action of steam. This steaming operation effects the combination of the coloring matter and mordant, and the color is thus developed and at the same time fixed upon the calico. Black is produced with logwood extract and chromium acetate, scarlet is produced with cochineal extract and stannous chloride. The prints are washed and dried after steaming, the colors being usually bright, but not very fast. Steam-colors, fast to light and soap, are obtained in a similar manner by printing mixtures of alizarin and allied coloring matters with mordants, and then steaming. These are used in the so-called madder extract or steam alizarin style, in which red, pink, purple, etc., appear. In the pigment style use is made of pigments, or insoluble colored mineral powders, as ultramarine-blue, chrome yellow, Guignet's green, etc. These are mixed with a solution of egg or blood albumen, printed, and steamed. The albumen, coagulates on steaming, and thus adheres firmly to the cloth, at the same time enclosing the pigments within the coagulum. Such colors are fast to light and soap, and may therefore be printed simultaneously with the steam alizarin colors for the production of variegated fast prints. Another class of colors are the so-called basic colors, as magenta, aniline blue, etc. Their solutions may also be thickened with albumen, printed, and steamed, to give fast steam-colors. It is more usual, however, to print a mixture of the thickened color solution and tannic acid, and to pass the steamed print through a boiling solution of tartar emetic. By this means an insoluble color-lake (tannate of antimony and color-base) is fixed on the calico, which is fast to soaping, but not to light. Basic colors applied in this manner are now usually printed along with the steam alizarin colors, instead of pigments, thickened with albumen, and

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variegated fast prints are thus obtained. Loose pigment colors are basic colors thickened with starch or gum tragacanth only, and then steamed. Such prints do not even stand washing with cold water.

Turkey-red Style.—In this style use is made of the fact that turkey red is at once bleached by the action of chlorine. Plain dyed turkey-red calico is printed with tartaric acid, dried, and passed through a solution of bleaching-powder. In the printed parts chlorine gas is evolved, the red is destroyed, and a white discharge pattern is produced. A blue pattern results if Prussian blue is added to the printing mixture; yellow is obtained if a lead salt is added, and the fabric is afterward passed through bichromate of potash solution, whereby yellow chromate of lead is produced; green results from a mixture of the blue and yellow; black is printed direct. These and other discharge colors may also be obtained by other methods.

Indigo Style.—Of the numerous indigo styles in use it is only possible to refer to one or two of the most important. Indigo blue patterns on a white ground are obtained by printing a thickened mixture of finely-ground indigo and caustic soda on white calico, previously impregnated with glucose. A subsequent steaming reduces the indigo to indigo white, and causes it to penetrate the fibre, while a final washing oxidizes, regenerates, and fixes the color. A resist white pattern on a blue ground is obtained by first printing upon white calico a resist paste composed of gum or flour, China clay, sulphate of copper, etc. When the printed calico is dyed in the indigo vat the paste resists the entrance of the color, partly in a mechanical and partly in a chemical manner, hence the blue is only fixed in those parts which are unprotected by the paste, after the removal of which by washing, the white pattern appears. Various resist colors, as yellow, green, etc., are obtained by the addition of different chemicals to the paste and altering the after-processes. A discharge white pattern on a blue ground is obtained by printing on plain indigo-blue-dyed calico a solution of bichromate of potash thickened with gum, and then passing the fabric through a solution containing sulphuric and oxalic acids. During this passage there is liberated, in the printed parts only, chromic acid, which at once oxidizes and destroys the blue, producing the desired white pattern. Colored discharge patterns are produced similarly by employing albumen thickening instead of gum thickening, and adding to the printing mixture such pigments as are not affected by acids, for example, vermilion, chrome yellow, Guignet's green, etc.

Bronze Style.—Manganese brown or bronze is decolorized by reducing agents; hence white discharge patterns on a bronze ground are obtained by printing plain manganese-brown-dyed calico with a mixture of stannous chloride and oxalic acid, and then steaming. Colored discharge patterns are obtained if coloring matters are added to the printing mixture which are not affected by reducing-agents, or which even require stannous chloride as a mordant to develop the color, as Prussian blue, chrome yellow, Persian-berry yellow, Brazil-wood pink, safranine, acridine orange, etc.

Aniline Black Style.—Aniline black being a product of the oxidation of aniline, patterns in

this color on a white ground are obtained by printing a thickened solution of aniline hydrochloride containing the oxidizing agent, sodium chlorate, and a salt of copper or vanadium. When the printed fabric is slightly steamed or exposed to a moist, warm atmosphere, the impression, which is at first devoid of color, gradually becomes dark green, and this by a final treatment with an alkaline solution, soap, etc., changes at once to a rich black. The color is extremely fast to light, alkalis, acids, etc., and it is largely employed by the printer, both alone and in conjunction with dyed or steam colors. The development of the black during the ageing or oxidizing process occurs only in the presence of a mineral acid, hence resist whites are obtained by first printing the design on the white calico with thickened solutions of substances of an alkaline or reducing character, or salts of organic acids, as acetate of soda, and then printing or padding over all with the aniline black mixture, ageing, steaming, etc. Where the design is printed the alkalinity entirely prevents the development of the black. Pigment colors thickened with albumen, also certain benzidine colors, containing an admixture of chalk, acetate of soda, etc., are largely employed in this manner. These resist colors may also be printed immediately after the application of the aniline black mixture, before the development of the color by ageing.

Azo Color Style.—The so-called insoluble azo colors result from the interaction of an azo compound and a phenol. Two methods of printing based upon this principle are employed. One method is to print the design with a thickened solution of β -naphthol on the white calico, and then pass the fabric through a very cold solution of the azo compound (developing-bath), when the design at once appears in a color corresponding to the azo compound employed. Another method is to print the design with a thickened solution of the azo compound upon calico which has been previously impregnated with a solution of sodium-naphthol and dried; in this case the color of the design is developed in the moment of impression. The necessary azo compounds are obtained by the action of nitrous acid, on salts of amido substances for example, paranitraniline, naphthylamine nitrotoluidine, dianisidine, etc., each of which yields a distinct color, bright red, claret red, orange, blue, etc. The naphthol-prepared cloth and also the azo compounds are somewhat unstable, so that this style is not successfully printed without considerable care. The insoluble azo colors, also the direct or benzidine colors, are capable of furnishing discharge patterns, since, in common with the azo colors generally, they are readily decomposed and destroyed by reducing-agents. It suffices to print calico dyed with these colors, as benzopurpurine, chrysophenine, benzoazurine, Mikado brown, etc., with a mixture containing stannous acetate, zinc powder, or other similar reducing-agent, and then steam the printed fabric, to obtain white discharge patterns. If there be added to the printing mixture such mordants and coloring matters as are not affected by reducing-agents, for example, safranine, auramine, etc., a variety of colored discharges are obtained, exactly as in the bronze style. Many of the benzidine colors may also

CALICUT — CALIFORNIA

be printed direct on white calico to furnish color designs, but such prints are not particularly fast to washing.

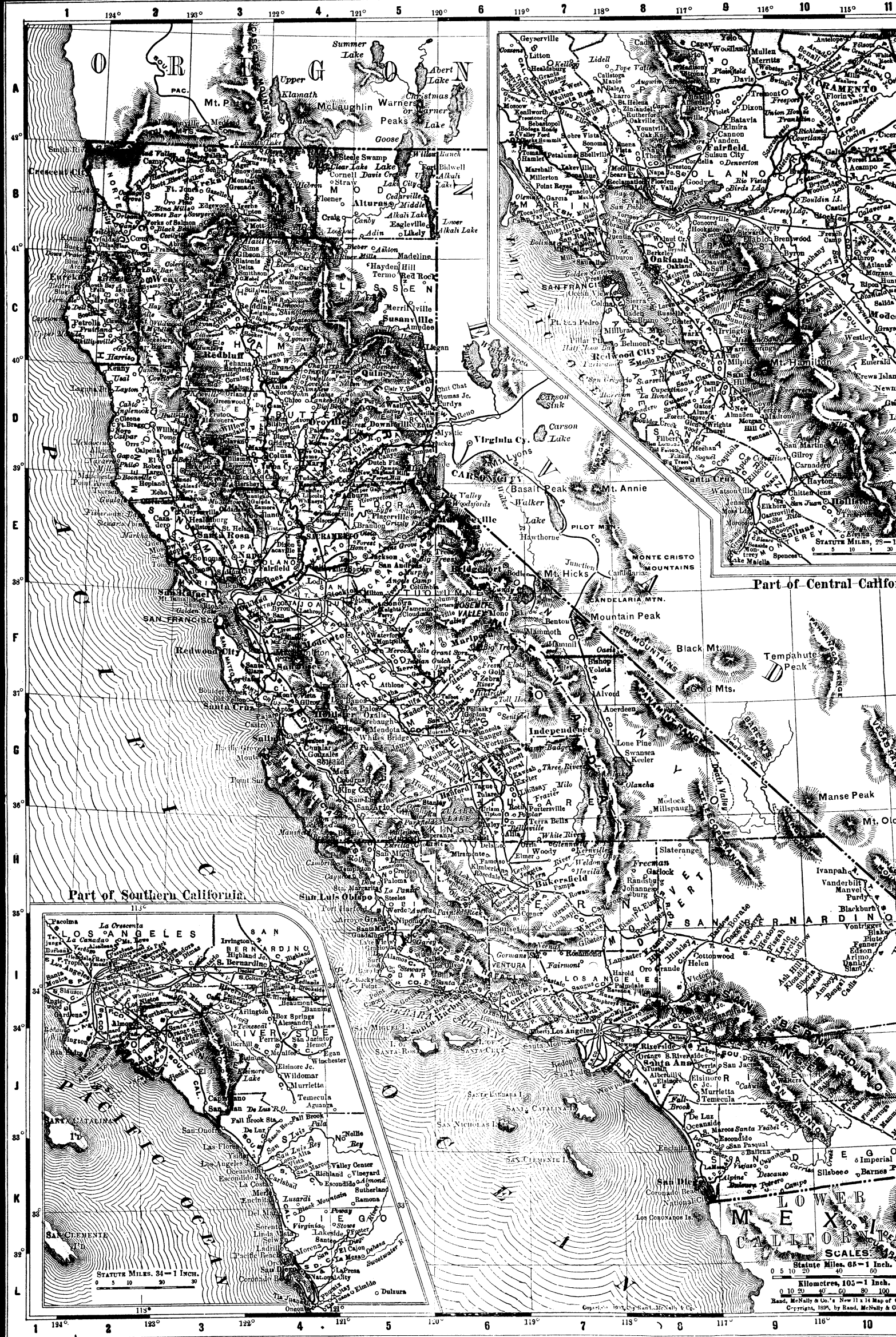
Cal'icut, India, a seaport in the presidency of Madras, on the Malabar coast, six miles north of Beypur, in the midst of extensive palm groves. It is an important place, with various public offices and institutions, including courthouse, customs-house, lunatic asylum, Anglican, Lutheran, and Roman Catholic missions, municipal and other schools, barracks, lighthouse, etc. The town dates from the 13th century, and was the first port in India visited by Europeans. It was from the name of this place that the word calico was derived. Vasco da Gama visited it in 1498, and in 1510 Albuquerque wrecked the town. In 1766 Calicut was taken by Hyder Ali, and in 1790 it fell into the hands of the British. Cardamoms, teak, sandal-wood, pepper, and wax are the principal exports. Pop. (1901) 75,510.

California, principal Pacific coast State of United States (No. 31 in order of admission), bounded north by Oregon, south by Mexico (Lower California), east by Nevada and Arizona, west by Pacific Ocean. Extreme length about 800 miles, coast line 1,097 miles, greatest width about 270 miles. Area (No. 2 in United States) 158,360 square miles (2,380 water). Pop. (1900) (No. 21 in United States) 1,485,053 or 9.5 to square mile (No. 37 in density). Whites, 1,402,727.

Topography and Climate.—Its peculiar shape, determined no more by political than by natural delimitations, gives California a character unique among the States, climatically and economically. It has a climate all its own, and its boundaries include all that climate in North America. It is longest of the States; and, in proportion to its length, narrowest. It corresponds with an area which upon the Atlantic seaboard should run as far inland as does South Carolina, and as long coastwise as from Charleston to Boston. This in itself gives large range of climate by latitudes; but its topography and its colimitations greatly increase this range. Its peculiar projection or "leaning out" upon the Pacific; its enormous coast line (somewhat less than one fifth total coastline of the United States); and particularly its "exposure" to the west and south upon this great equalizer; its contact on the east with the "Great American Desert"; its huge mountain systems; and its orographic protection against the north, are all vital factors in determining its atmospheric temperament. While the Atlantic seaboard is made humid by the warm Gulf Stream, and is open to the north (its mountains being scattered, low, and well inland), California is screened from the Arctic air-currents by a vast Alpine range, almost unbroken in its whole length and with its lowest passes 50 per cent higher than the highest peak east of Colorado. The State has 120 peaks exceeding 8,000 feet; 41 exceeding 10,000 feet; and 11 exceeding 13,000 feet. From its northern boundary down to Point Conception, California is washed by the cold Kuro Siwo, or Japan current, swinging back from the Arctic; and the exposure is largely westerly. From this point southward, the exposure is more southerly, the Japan current is deflected far offshore, and the coast is sheltered by a long line of islands. Tempered on one side by an equable

ocean, on the other by 1,000 miles of arid lands, the climate of California is still further differentiated by its mountain systems. Roughly speaking, it is all "under wall." Two huge cordilleras, insculcating at the north and south, form an almost complete circumvallation of the great agricultural region; while to the south, though the ranges are much broken down, there is something like a repetition of this pattern, on a much smaller scale; the whole forming something like an inverted figure 8. In their major loop, these ranges enclose one great central valley, practically level, of 18,000 square miles,—or about the aggregate area of Massachusetts, New Jersey, and Delaware,—screening it from the Arctic, and filtering the winds from sea and desert. This great rampart is broken down only at the Golden Gate, through which, in a mile-wide passage, the drainage of this enormous watershed reaches the sea. In their imperfect minor loop, there is a broken congeries of valleys aggregating an almost equal area, sheltered from the desert, but as a rule partially open toward the sea. To the east of the main wall lies a large but almost uninhabited area, strictly desert, and part of the great interior wastes. The inclination of the State to the west, and its consequent southern exposure, is indicated by the fact that despite its narrowness the extremes are three fourths as far apart in longitude as in latitude. The corner of San Bernardino County is nearly 500 miles more easterly than False Cape; while from Oregon to the Mexican line the north and south distance is about 655 miles.

The Coast Range, altitude 2,000 to 8,000 feet, rather closely follows the coast line from Oregon to Point Conception; south of which topographic hinge it so breaks down as to be relatively unimportant. The Sierra Nevada, proximately following the east line of the State, at an average distance of 50 to 100 miles therefrom, is "the largest and most interesting chain of mountains in the United States" (J. D. Whitney). Really part of the gigantic spine which extends from Lower California to Alaska, this range in California is 600 miles long and 75 to 100 miles wide—its base covering four times the area of Massachusetts. The snow-line averages about 30 miles wide. Its surpassing peak (Mt. Whitney, highest in the United States) is 14,522 feet (Langley). Its passes average 11,000 feet, the lowest being 9,000 feet, and the most used (Kearsarge) 12,000 feet. The western slope is gradual, averaging about 100 feet to the mile; its eastern slope 10 times as rapid, being by far the steepest general gradient in North America. At many points the fall is 10,000 feet in 10 miles; and from the highest peak in the United States one looks down nearly 15,000 feet into Death Valley, some 200 feet below sea-level. This vast granitic range is the most remarkable register of glacial action on the continent. Decapitated by "perhaps a vertical mile" (Muir) it is still the most Alpine cordillera in North America. It holds 1,500 glacial lakes—the lake line being at about 8,000 feet. Of small residual glaciers, Muir has counted 65 between 36° 30' and 39°. Its yosemites (including the famous one so-called, the Hetch-Hetchy, and minor ones) are famous among geologists as well as travelers—well-like valleys gouged deep in the granite by glaciers, and of scenery nowhere surpassed. The highest



Part of Central California

Part of Southern California

STATUTE MILES, 34-1 INCH.
0 5 10 20 30
Kilometres, 105-1 INCH.
0 10 20 30 40 50 60 70 80 90 100
Band, McNally & Co.'s New 11 x 14 Map of California
Copyright, 1894, by Rand, McNally & Co.

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water-fall in the world (the Pioneer, 3,270 feet) is in this region. Upon the huge moraines left by that continental incubus of ice grow the noblest coniferous forests in the world—greatest in variety of species, in density of merchantable lumber and in size, age, and beauty of trees. These forests cover 44,700 square miles (a larger area than the entire States of New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, Delaware, and Maryland together). California is fifth in area of forests and second in stand of lumber (200,000,000,000 feet, exceeded only by Oregon with 225,000,000,000. Cut, 1900, 864,000 M.). Seven national forest reserves in the State cover 8,511,794 acres. The Big Tree (*Sequoia Gigantica*) is the largest and oldest of growing things on earth; averaging 275 feet high and 20 feet diameter. The largest reach over 325 feet high and 38 feet diameter, with an age of 5,000 years. Muir "never saw a Big Tree that had died a natural death." The other Sequoia (*Semprevirens*), or California redwood, covers an area of about 2,000 square miles. It is second only to the Big Tree in size, reaching 18 feet diameter; and like it is found nowhere else. It belongs to the Coast Range, as the Big Tree to the Sierra. It is almost exclusively used in California for sheathing. The immunity of a city like San Francisco from great fires, though windy, hill-built, and of "frame," is largely due to the non-inflammability of this redwood lumber. The sugar pine, the noblest pine yet discovered, reaches 245 feet high and 18 feet diameter; the yellow pine 220 feet high and 8 feet diameter; the Douglas spruce, king of spruces, 200 feet high, 6 feet diameter; the Libocedrus, or incense cedar, 150 feet high and 7 feet diameter; the white silver fir 200 feet high, 6 feet diameter; the "magnificent" silver fir 250 feet high and 5 feet diameter. The nut pine, or piñon, is a small and shabby tree, but of great economic importance in feeding the Indians; in a good year its crop of excellent nuts is enormous. These are often fed to horses instead of barley. There are many varieties of oaks (which reach great size); also maples, yews, birches, alders, sycamores, cottonwoods, aspens, madroños, etc. A California palm (*Washingtonia*) is native in mountain cañons along the southerly desert, and is now largely used for street ornamentation. Specimens planted by the Franciscans have reached a height of 80 feet. The flora of the State includes about 2,500 species, and is of great interest. In the great central valley in February or March one can travel 400 miles, treading flowers at every step; and as much is true in other parts of the State.

No other State contains a moiety of the vast number of exotic trees now in California. Fruit, ornamental, and shade trees from every country in the world have been acclimated here. Nearly 9,000,000 tropical fruit trees were bearing in 1900. Millions of "pepper-trees" (*Molle*) from Peru are used on streets, etc.; and of Australian eucalyptus, (introd. 1858), there are now over 10,000,000, including about 100 varieties for fuel and ornament. Setting 2,000,000 acres to orchard and other trees within a generation has partially balanced the deforestation by lumbermen.

The most striking meteorological feature of California is perhaps the ordering of its seasons,

of which it has practically but two, the wet and dry. The winter, or "rainy season," is approximately from late October to late April, with 15 to 25 rainy days, an annual precipitation ranging from 23.53 inches for San Francisco (and far greater in the extreme north) to 14.56 inches for Los Angeles, and 10 for San Diego. For six months after 1 May, rain is practically unknown, except showers in the high mountain regions. In the high Sierra the winter precipitation takes form of snow, with an annual fall of 30 to 50 feet, thus supplying the natural reservoirs which feed the streams, upon irrigation from which agriculture largely depends. But in Oregon, which bounds California on the north, we have the familiar eastern seasons; and again in Arizona and Nevada, abutting upon the east, winter snow and summer rains characterize the meteorology. Thus, climatically, California differs altogether from all its neighbors, and has well been called an "Island on Land." Within its own limits, also, it has extraordinary range of climates, as it were in strata, following the topographic contours. Thus in the vicinity of Los Angeles it is possible at times to take a sleigh-ride within 12 miles of the city on one side (and looking down upon blossoming orange groves not five miles distant), and by an hour's ride to bathe in the Pacific, which has here a winter temperature of 60°. Within a short journey from almost any given point one may find almost any variety of climate, from below sea-level to nearly 15,000 feet above it; from the extreme but arid and non-prostrating heat of the desert to eternal snow; from palms and perennial roses to the primeval coniferous forests, or to the desolation of alkaline Saharas. Although all California shares the seasonal peculiarity of "California climate," the northern and southern parts of the State—roughly dividing at Point Conception and the Tehachapi Range—are very unlike meteorologically. The upper portion is relatively humid, with more than twice the average rainfall, with far larger streams and vastly richer forestation. At Crescent City, on the far north coast, precipitation often reaches 80 inches per year. The trend of the coast is here northerly, and the region shares something of the extraordinary humidity of Oregon. The smallest precipitation is in the desert southeast corner, averaging only three inches annually at Yuma. The seven counties habitually termed "Southern California"—though the geographic southern half of the State would include 13 counties—have an average rainfall of but about 15 inches. This precipitation is insufficient to insure crops, except cereals (which are not irrigated but depend on the rains). This broad difference between the two sections in rainfall has been chief factor in an extraordinary difference of development within the last 15 years. Compelled by aridity to resort to irrigation; compelled by the magnitude of this task to associative effort, the southern communities have suddenly developed a generic type of agriculture and of life quite unlike anything else in the Union. The paragraph on population shows something of the disproportionate settling-up of the southern end of the State—an entire reversal of the balance which obtained for nearly 40 years, during which the population was overwhelmingly about the Bay, and San Francisco

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was practically California, socially, politically, and financially.

About San Francisco there is steady and brisk wind movement, flowing in through the narrow gap of the Golden Gate. In Southern California, while there is daily ebb and flow of air-currents (in the morning from off the sea, and at night down from the mountains), a real wind is very rare. Hurricanes and cyclones are absolutely unknown in the State. Despite the great heat of the deserts, and high mercury sometimes recorded in the valleys, the dryness of the atmosphere renders it harmless, and sunstroke is unknown. Seasonal diseases, typhoids, malarias, and pernicious fevers, summer diseases of children, gastric or hepatic diseases, are rare. Mean summer temperature San Francisco 60°; winter mean 51°; greatest daily range temperature Los Angeles 29°, as against 69° for Boston. The modern migration to California has been largely attracted by this unique and hospitable climate, free from the dangerous heats of summer and the bitter winter cold of the regions east of the Rocky Mountains. In the inhabited portions of this State, extreme cold is unknown; while owing to rapid radiation, the summer nights are always so cool as to call for blankets.

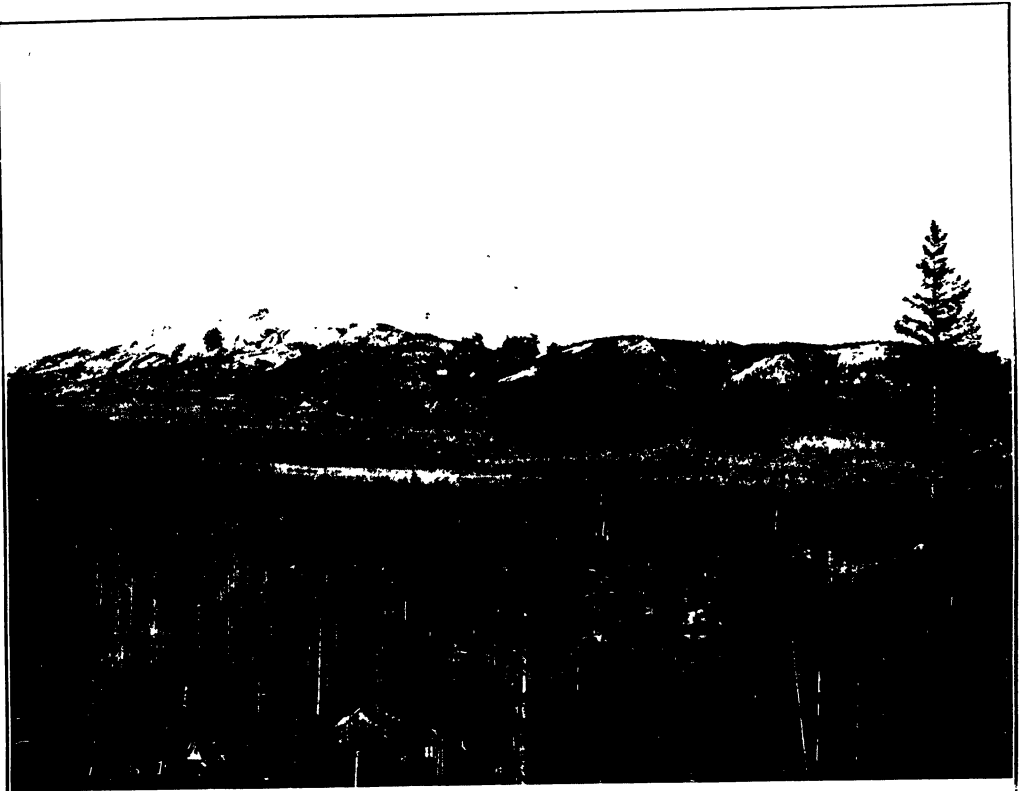
The fauna of California is peculiarly interesting, and includes considerably over 100 species of mammals, though the larger game varieties have in a half century been nearly exterminated. At the American occupation, elk were seen in droves of thousands. Great numbers were killed from the deck of steamers plying to Sacramento. Occupation of the State by Indians immemorably, and by Spaniards for nearly a century, had not appreciably diminished the wild animals; but the same wanton spirit which in a score of years exterminated tens of millions of the American bison on the great plains has in California made the great mammals nearly extinct. The grizzly bear, once in great abundance in all parts of the State, is now very scarce; the black, cinnamon, and brown bear are more common. Sea lions of a ton weight are still numerous along the coast, and their populous rookeries a few hundred feet from the Cliff House in San Francisco are an object of interest to travelers. The California lion, mountain lion, or puma, is still not infrequent, and wildcats abound in the mountains. The coyote is common, and of utility in decimating the hordes of rabbits; though an ill-judged bounty on coyote scalps has of late years much reduced the numbers of this small wolf. The beaver, once in vast numbers here, is now confined to the remotest mountain streams; and the valuable sea otter is almost extinct. Black-tailed and mule deer are still reasonably frequent; but the antelope, which once roamed the northern and southern valleys in great bands, have hardly a representative left. The same is true of the mountain sheep (*Ovis Ammon*), once common in all the higher ranges. Spermophiles, or ground squirrels, and five species of gopher, are numerous and a great pest to the farmer. Jack rabbits and "cotton-tails" are abundant in all parts of the State, despite community "drives" in which sometimes tens of thousands are killed in a day. The birds of California number above 350 species. The largest winged creature in North America is the California condor.

Quail of two species are in vast abundance throughout the State.

While the Pacific coast of North and South America in general is peculiarly liable to seismic disturbances, California has never experienced an earthquake of the first magnitude, nor anything approaching that of Charleston, S. C., in 1886; nor that of New Madrid, Mo. The severest shocks were in 1812, when 30 people were killed by the fall of a church tower in Capistrano; and that of 1872, when about a score perished in Owen's Valley. Historically, not so many people have been killed by earthquakes in California since its discovery as die every summer of sunstroke in two or three chief cities of the eastern United States.

River Systems.—As in most arid States, the drainage of California is simple. For some 300 miles on its southeastern edge the State is bounded by the Colorado River, which rises in the Rocky Mountains in Colorado and flows 1,360 miles to the Gulf of California. It has no tributaries whatever from California, all east-bound streams from the Sierra Nevada being lost in the desert. On the western coast, though a few rivers reach the sea (like the Klamath, Mad, Eel, and Salinas) they are relatively unimportant and incidental. The real drainage system of the State has outlet through San Francisco Bay and the Golden Gate, by the two chief inland rivers which join about 60 miles northeast of San Francisco. Both rise in the Sierra Nevada, the Sacramento (370 miles long) to the north, the San Joaquin (350 miles long) to the south. Their main course averages along nearly the median line north and south, through nearly two thirds the length of the State. They have no tributaries worthy of the name from the great westerly mountain wall, the Coast Range; their waters being fed almost exclusively from the vast Alpine chain which is in effect, though not politically, the eastern boundary of California down to latitude 35° 30". Their important feeders from the Sierra are the Feather, Yuba, Cosumnes, American, Mokelumne, Kern, Kings, etc. All these are fine mountain torrents, beloved of sportsmen, and flowing through magnificent scenery, but not of rank as waterways. The most important is the Feather, which has a large drainage area. Several streams in Southern California, like the Los Angeles, San Gabriel, and Santa Ana, reach the sea, but all are practically exhausted by irrigation uses, except during winter flood-water. The many streams from the abrupt eastern slopes of the Sierra Nevada all disappear in alkaline "sinks,"—like Pyramid Lake, Owen's Lake, Mono Lake, and Death Valley,—and never even in flood reach the ocean by their great natural conduit, the Colorado River. The lakes of California are not important as to navigation. Tulare Lake, receiving the drainage of the Kern, Kaweah, and Kings rivers, is 700 square miles in area, but only 40 feet deep. In very high water its overflow reaches the San Joaquin; but ordinarily its income of waters is cared for by evaporation. Lake Tahoe in the extreme north, at an elevation of 6,200 feet, is 20 miles long and 1,500 feet deep, and famous for the purity of its waters, the beauty of its scenery, and its trout. It is largest of the glacial lakes, of which there are a great number in the Sierra, mostly at altitudes exceeding the highest mountain summits east of Colorado. The lower-lying

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1. Mt. Shasta, from Sisson's.

2 Mt. Tamalpais, near San Francisco.

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lakes of the State are mostly without outlet, and of various degrees of brackishness, culminating in the "sink" of the Amargosa River nearly 200 feet below sea-level on the eastern side of the range; where evaporation has left vast alkaline deposits, now of great commercial value.

Geology.—The main axis of the Sierra Nevada is of granite throughout. To the north there are some metamorphic peaks, and many summits are capped with volcanic materials. Mt. Shasta in the far north is an extinct volcano (14,470 feet). So also is Lassen's Peak (10,577 feet). This granite core is flanked by a very heavy mass of slaty metamorphic rocks,—mostly argillaceous, chloritic, and talcose slates,—constituting the great auriferous belt of the Sierra. The Coast Range is made up almost entirely of cretaceous and tertiary marines, chiefly sandstones and bituminous shales. It is in this belt that the great recent development of petroleum has been made.

Besides the vast reaches of alluvial soils in the lower valleys, which were first attacked for agriculture, an enormous area of disintegrated granite gravels along the foothills and first acclivities has been found the most productive soil in the State, particularly with reference to valuable crops. These great gravel beds, which seem to the farmer from the black "bottoms" of Ohio the most unpromising of soils, are in reality rich in all the elements of plant food. The vast majority of the valuable orchards, particularly of Southern California, are planted upon this granitic detritus; and without exception the finest oranges and other citrus fruits come from this soil. The relative aridity of California, long supposed to be a curse, is now known to be a two-fold blessing. Exhaustive analyses, comparative with every portion of the Union, show these gravels to average much richer in chemical constituents than soils leached out by excessive rainfall. Furthermore, the fact that precipitation is not invariably sufficient to insure crops has compelled irrigation, which does insure them; so that farmers in the arid lands have much greater crop-certainty than those of regions with most abundant rainfall.

Agriculture.—In no item of its history has California been more unlike other States than in development and sequences of agriculture. The first (and for 60 years commercially chief) industry was cattle—derived from herds introduced from Mexico by Viceroy Galvez, 1769, and chief wealth of the Mission establishments and Spanish colonists. It was a generation after the American occupation before agriculture was seriously undertaken; and for another term of years it was chiefly a gigantic seasonal "gamble with the weather" in dry-farming of cereals. The characteristic features of agriculture up to about 1870 were enormous holdings,—reckoned at least by tens of thousands of acres,—with the single crop (almost exclusively wheat and barley) and purchase of every other article of necessity or luxury. On areas of hundreds of square miles apiece there were an individual or corporate owner, a single crop, a few hundred hirelings at the height of the season, and their temporary quarters. A few of these enormous ranchos still survive; and Miller and Lux still farm about 1,000,000

acres, with 20,000 acres in a single field. But within a generation the typical character of agriculture in California has radically changed. The greatest recorded drouth (1864) which not only destroyed grain but hundreds of thousands of cattle (60,000 head being sold that year in Santa Barbara at 37½¢ per head), exclusion of the Chinese, who had been the chief reliance for labor on the great ranchos, the fall in wheat, and other factors, led to the breaking up of these gigantic domains. A slight idea of the change may be had from the census fact that in 1850 the average size of all California farms was 4,456.6 acres; and in 1900, 397.4 acres. Along with this great dry-farm gambling—for such it was—sheep became a leading industry in the State, particularly in Southern California.

Within about 15 years—that is, since 1885,—the general character of California farming has changed to small holdings, occupied not by tenants but by American owners, with families, with diversified crops, and obliged to purchase only the luxuries of life; with intensive methods and certainty (by irrigation) of crops. California has now more than one fourth of all the irrigators in the United States. The average size of irrigated farms is in Southern California 21¼ acres; in rest of State about 82 acres. The typical California farm under the modern régime is perhaps 10 acres; irrigated either by its own pumping plant or from a community ditch, and yielding an annual income of not less than \$200 per acre.

Perhaps the greatest single factor in bringing about this structural change was the orange. In 1862 there were 25,000 orange trees in the State, all seedlings, and deriving from Mexico, where the fruit was introduced by the Spaniards nearly three and a half centuries earlier. In 1873 two seedless orange trees from Brazil were sent from the Department of Agriculture in Washington to Riverside, California. From these two parent trees has sprung the modern orange industry of California—and practically of the United States; as Florida, the only other orange State in the Union, yielded in 1900 273,000 boxes of oranges to California's 5,882,000. Millions of trees from their buds are now bearing or growing in this State, and the hereditary fruit, seedless and delicious, leads the American market. This crop, highly remunerative, and practically continuous (shipments being made every month in the year) has been for these reasons, and æsthetic ones, a large attraction to high-class immigration, and an important factor in shaping agricultural methods. For development of the industry, see statistics below.

In deciduous fruits, total production, shipments fresh, canning and drying, California has within a generation come to lead the Union; as it leads in all tropical fruits.

California is first successful grower of sugar beets, and has by far the largest factories. In 1900 it had 37.4 per cent of acreage and 44.9 per cent of beet sugar product of the entire Union. The sensational achievements of Luther Burbank in hybridizing fruits—for instance, the creation of a large plum without any pit whatever—are already world-famous. Almost as remarkable results have been reached in floriculture. Seeds and bulbs are raised on

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a great scale; carnations, calla lilies, and other flowers being grown outdoors by the 10-acre field.

Total area of California farms is now over 45,000 square miles; considerably exceeding entire area of States of Massachusetts, New Hampshire, Vermont, Connecticut, Rhode Island, and Maryland. The State is eleventh in the Union in per capita value of farm products (\$88) and fifth in value products per farm (\$1,816 as compared with Ohio, \$929).

California has (1900) 72,542 farms; total value of farm property, \$796,527,955; total value farm products 1899, \$131,690,606. Total acreage in farms, 28,828,951 acres, of which 11,958,837 acres are improved. The area farmed has increased 34.5 per cent since 1890. In 1850 there were 872 farms; in 1860, 18,716. The development of farming is briefly indicated as follows:

Year	Farms	Acres	Val. farm Property	Value Products
1900.....	72,542	28,828,951	\$796,527,955	\$131,690,606
1890.....	52,894	21,427,293	772,065,570	87,033,290
1880.....	35,934	16,593,742	305,999,443	59,721,425
1870.....	23,724	11,427,105	147,617,176	39,884,820

The largest number of farms is in Los Angeles County (6,577); three other counties have over 3,000 farms each; Santa Clara, 3,995; Sonoma, 3,676; and Fresno, 3,290. Of all farms, 70,935 are farmed by whites; 658 by Indians; 777 by Chinese; 135 by negroes; 37 by Japanese.

Dairy cows have increased more than seventy-fold since 1850, now numbering 307,245. Of other neat cattle there are 1,137,379; horses, 421,293; mules, 87,000; sheep, 1,724,968; swine, 598,336. Total value animal products 1899, \$36,324,894—including milk, butter, and cheese, \$12,128,471; animals sold and slaughtered, \$15,754,985; poultry and eggs, \$6,356,740; wool, \$1,707,088. Sheep and wool have decreased steadily since 1879, with the great increase in value of lands for farming. The principal crops in 1899 were: Wheat, \$20,170,044; hay and forage, \$19,436,398; orchard fruits, \$14,526,786; tropical fruits, \$7,219,082; grapes and small fruits, \$6,534,236; barley, \$10,645,723; corn, oats, and rye, \$2,652,777; hops (nearly one fourth of total United States output), \$925,319; sugar beets (nearly half total United States output, \$1,550,346; potatoes and sweet potatoes, \$2,773,140; dry beans (one fourth total output of United States), \$1,022,586; other vegetables, \$2,929,465. The total value of farm crops in 1899 was \$95,365,712.

From 1850 to 1900 the population has increased sixteen-fold; number of farms over eighty-fold. California is one of the few States that in the last 30 years has added more to its agricultural than to its other population.

Irrigation and Horticulture.—Development of the new and characteristic agricultural era in California is outlined by these statistics (1900):

	No. Irrigators	Acres Irrigated	Value Irrigated Crop
United States..	102,819	7,263,273	\$84,433,438
California	25,611	1,445,872	32,975,361

Of the 72,542 farms in the State, 25,675 or 35.4 per cent are irrigated, an increase of 44 per cent in 10 years; the number of irrigators

has increased in the same term 87 per cent. Total cost of construction of all irrigating systems, \$19,181,610; so the irrigated crop of 1899 alone paid nearly \$14,000,000 in excess of total cost of works. Los Angeles County leads by far in number of irrigators (4,066); only Fresno (2,459) having one half as many. In number of acres Fresno County is far in the lead, with 283,737 acres; Kern next with 112,533, and Merced, 111,330.

Of the total 1,445,872 acres irrigated, 1,293,608 are irrigated from streams; the balance from wells, 6,894 farms being irrigated from wells. More than half of all the flowing artesian wells in the United States are in California; and besides these a large number of farms are served by power pumps from phreatic wells. There are 1,913 main canals and ditches, aggregating 5,106 miles. In many places tunnels driven into the foothills supply streams for irrigation.

Of deciduous orchard trees there are in the State 28,138,471; including (in that order) plums and prunes, peaches, apricots, apples, pears, and cherries. The value of their product is \$14,526,786. In 1900 the number of plum and prune trees is greater than total number of all deciduous orchard trees in 1890. The number of apricot trees has more than doubled in the decade.

Total number of semi-tropical fruit trees has increased from 1,809,161 in 1890 to 8,996,459 in 1900. Of the latter number, 62.8 per cent are orange trees; 17 per cent olives; 16.6 per cent lemons; 2.1 per cent figs. Other trees included are guavas, kaki, limes, pineapples, pomelos, etc. The counties of San Bernardino, Los Angeles, Riverside, and Orange contain more than four fifths of the orange trees. The number for the State is nearly five times as great as in 1890. Orange and lemon shipments, 1890, 2,400 carloads; 1900, 18,000 carloads. San Diego and Los Angeles counties contain more than half the lemon trees of the State, the number being more than 18 times as great as in 1890. There are 5,648,714 orange; 1,493,113 lemon; 1,530,164 olive trees in the State.

Strawberries, blackberries, raspberries, and other small fruits produced in 1899, \$911,411. Fifty-two of the 57 counties raise grapes. California is the principal wine-producer of the Union, yielding more than one half the total product. The yield for 1899 was 5,492,216 gallons of wine and 3,403,368 centials of raisin grapes. California is the only raisin State; its annual product is about 40,000 tons.

Mining.—So early as 1690, Loyola Casallo mentions seeing placer gold in California; large nuggets were described (by Antonio Alcedo, 1786) in the 18th century. Not later than 1841, gold was found on San Francisquito Creek, Ventura County, about 45 miles from Los Angeles, and was "washed" there by Mexicans on a modest scale. On 19 Jan. 1848, James W. Marshall, an American from New Jersey, employed by the Swiss pioneer, John Sutter, in building a saw-mill near Coloma, on the north fork of the American, picked up yellow metallic flakes in the mill-race; the news spread in spite of efforts to suppress it, and in a few months the gold rush was on. Up to 1848 the whole United States had produced less than \$12,000,000 in gold since the discovery of Amer-



SOUTHERN CALIFORNIA PALMS



CALIFORNIA ROSE GARDEN

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ica; in five years following California alone yielded over \$258,000,000. The annual gold product of the State, from the discovery to 1859 inclusive, was in million dollars, 5, 10, 45, 75, 85, 65, 65½, 65, 57, 50, and 50. Not until 1865 did annual gold output of California fall below \$30,000,000. Up to 1 Jan. 1900, the gold product of California was \$1,409,849,068. Since that time the annual output has been between \$15,000,000 and \$16,000,000. No other State or country in the world has approximated this aggregate yield, though in the last few years Colorado has led California in annual production of gold. This first bonanza in United States history had a profound economic, sociologic, and political effect. "Sound money" was as yet unknown in this country; silver and gold together in the whole Union up to 1848 had not reached \$25,000,000 in total output; and the instability of the currency prior to the California gold discovery is familiar to students. The California gold-find not only precipitated such a shifting of population as had not before been dreamed of on this continent; it not only brought about the admission to the Union of a State distant 2,000 miles from any other State,—California was the first State in the geographic western half of the United States, and sixth west of the Mississippi River,—it furnished the finances for the great civil cleavage nominally most concerned with slavery, and gave the free States a majority in the United States Senate. It is probably not fanciful to hold that this "irrepressible conflict" could not so soon have opened had the nation been so short of bullion and of credit as it was prior to the gold discovery of 1848. Furthermore, in 1859, almost exclusively with California capital, labor, enterprise, and machinery, the great silver bonanzas of Nevada (just across the Sierra) began the remarkable record of 21 years, in which they produced over \$306,000,000 in bullion.

The first mining in California by Americans was crude, as it had been in Mexican days—"washing out" the auriferous gravels in the "gold pan." The first step in advance was the "rocker," employing two men, and foreshadowing a certain associative effort. Next came the "Long Tom," which made also for stability, since it could not be carried. Then came the sluice-box, a small wooden flume with wooden riffles on the bottom, behind which the gold sank and was saved, while the lighter sand and gravel were swept on by the swift current. In 1852, E. E. Matteson, a Connecticut Yankee, invented hydraulic mining, the greatest advance ever made in the placers. Water under high pressure, served through a nozzle called the "monitor," thrown 200 or 300 feet with such nozzle force that a crowbar could not be thrust into the jet, ate away whole hillsides almost as hot water disintegrates sugar; the detritus passing through long, riffled sluice-boxes. While this invention was the most essential yet made in mining, it was long disastrous to ultimate development of the State, agriculturally. In 1880 it was proved by engineers' measurements that on the Yuba River alone more than 100,000,000 cubic yards of gravel had been washed by hydraulics into the bed of the stream, raising it 70 feet; and burying 15,000 acres of farm lands under the débris. After a long and bitter fight, the "anti-Slickens" campaign ended

in 1884 in favor of the agricultural interests, and hydraulic mining in California has never since been on a large scale.

"Quartz mining"—that is, deep mining on the original veins from whose waste the placers derive—began in 1851, but did not take chief rank for many years. Now it is the principal form of gold mining in this State; and as it requires large capital, experience, and time, gold mining no longer attracts the multitude, though the State annually produces three times as much gold as set all the East in a fever half a century ago. California is the only ante-bellum State in the Union which has never had "soft money" or a depreciation of currency. The largest mint in the world is located in San Francisco.

In the 'sixties, extensive experiments were made by Thomas Scott of the Pennsylvania Railroad to develop petroleum in California, even shipping around the Horn barrels for the expected product. For various reasons, chiefly administrative, the experiment failed. The enormous seepages in many parts of the Coast Range tempted further prospecting, and finally producing wells began to be struck in the Puente, in Ventura County, and in Los Angeles city. In 1893 there were about 100 wells in California, producing in the year 400,000 barrels. By 1897 the annual product had increased to 1,903,411 barrels; and by 1900 to 4,324,481 barrels. In the latter year there were 1,590 producing wells and 470 drilling. Since then the increase has been rapid. During 1901, 1,116 wells were completed, and 526 drilling, besides 259 dry holes; and the product was 8,786,330 barrels. Total production in California up to and including 1901, 27,850,205 barrels; output for 1902, about 12,000,000 barrels. The oil fields embrace 17 counties, in a line over 600 miles long; chief producers, Kern, Los Angeles, and Ventura counties. Wells are from 700 to 2,000 feet deep. In the Summerland district most of the production is from wells put down in the ocean from piers. Extensive pipe lines now under construction will deliver at tide water the oil from Kern River and other districts.

California is the first State in the Union in total production of gold, and second in present annual output; second in present output of copper; eighth or ninth in output of silver; first in borax and soda; fourth in petroleum; fifth in salt; first in asphaltum, quicksilver (with two fifths of the total production of the world), and soda.

Total value of mineral products for California in 1901 was \$34,355,981, in 46 items. Principal products, with yield and value:

Gold.....	.....	\$16,989,044
Copper.....	34,931,785 lbs.	5,501,782
Petroleum.....	7,710,315 bbls.	2,961,102
Quicksilver.....	26,720 flasks	1,285,014
Silver.....	.....	1,229,356
Borax.....	22,221 tons	982,380

Other interesting items are asphalt and bituminous rock, \$378,573; lime, \$334,688; mineral waters, \$559,057; salt, 126,000 tons, \$366,376; soda, \$400,000. There is also considerable production of turquoise, tourmaline, antimony, asbestos, fuller's earth, graphite, manganese, magnesite, platinum, etc.; 54 of the 57 counties produce minerals.

Manufactures.—Between its first census (1850) and that of 1900, California gained 1,500 per cent in population and 2,196 per cent in aver-

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age number of wage-earners engaged in manufacturing. Although chiefly an agricultural and mining State, it had in 1900 140,330 persons engaged in manufacturing. In the last decade there has been great increase in number of establishments, capital, wage-earners, and value of products. This has been due to discovery and development of a cheap fuel, namely, petroleum. Though length of transcontinental haul (2,000 to 3,000 miles) from the great factory centres acted as a "high protective tariff," and many raw materials were abundant here, imported fuel-coal at \$8 to \$10 per ton was a heavy handicap to manufacturing. Within a decade, petroleum has become, from practically nothing, the third mineral product of California, reaching over 12,000,000 barrels in 1902. This is equivalent to coal at about \$3 per ton, and has enormously stimulated manufacturing. Twenty-five years ago, Prof. J. D. Whitney, dean of American geologists, was doubtful of any future for petroleum in California, and stated that certainly this State would never have flowing wells. There are now many "gushers" in California, and the petroleum industry is one of the most important. The locomotives of California railroads chiefly burn crude petroleum. Steam roadbeds and country highways are "sprinkled" with petroleum for thousands of miles. An overwhelming majority of manufacturers in the State now use it for fuel; and as local development of oil is only in its infancy, increase of manufacturing may be expected to take even longer strides. In the decade the per cent increase has been 58.8 in number of manufacturing establishments; 39.9 in capital; 41.9 in value of products; and in part of the State these figures have been nearly doubled. The leading manufactures are: Refining sugar and molasses, \$15,909,998; slaughtering and meat-packing, \$15,717,712; lumber and timber products, \$13,764,647; flouring and grist-mill products, \$13,100,944; canning fruits and vegetables, \$13,081,829; foundry and machine shop products, \$12,047,149; wines and liquors, \$9,261,600; car construction, \$7,553,626; tanning and finishing leather, \$7,405,981; printing and publishing, \$6,858,192; explosives, \$4,283,818.

Manufacturing statistics, 1900: Number of establishments, 12,582; capital, \$205,395,025; average number of wage-earners, 91,047; value of products, \$302,874,761. In per capita value of manufactured products California is twelfth State, with \$203.95 per capita; United States average, \$170.90 per capita. It is also twelfth in number of manufacturing establishments, and first in wages. It is eleventh in dairy products; fifth in capital in lumber; first in canning fruits and vegetables; first in all dried fruits; sixth in canning fish; eighth in number of establishments, and twelfth in value of product, in piano-making; third in ship-building; fifteenth in flour. The canning of fruits and vegetables has reached its highest development in California; and in output this State easily leads the Union,—being about three times in excess of the 6 New England States, 10 Southern States, 6 Western States, and Washington and Oregon, all together. Its product, 1900, was \$13,081,829. More than one half all canned peaches; more than two thirds all canned pears; nearly one half all canned cherries; nearly four fifths all canned plums; more than one half all canned beans; more than one half all dried

fruits, produced by the whole United States are from California. The increase in all items of manufacturing has been by far largest in the city of Los Angeles, where, for instance, the per cent gain in a decade has been in number of establishments, 88.7; number of wage-earners, 107.7; value of products, 115.3. The 1900 census specifies 181 manufacturing industries in California. Another new, but highly important industrial advance is long-distance transmission of electric power from mountain streams. In this California has for years led the world. When a 33,000-volt, 82-mile line from San Bernardino Mountains to Los Angeles was installed (1900), it far exceeded any other line in the world in length and voltage. Then 40,000 volts were brought 140 miles from Yuba River to Oakland—with cable crossing Carquinez Straits by suspension span of 4,400 feet, 300 feet in air. The longest power transmission in the world is (1903) from Colgate to San Francisco, 211¾ miles. Plants are now building to transmit 28,000 horse-power from Kern River, 116 miles, to Los Angeles; and 120,000 horse-power from San Joaquin River, 180 miles to San Francisco; and 218 miles to Los Angeles. One electric company expended \$250,000 per month throughout 1902, in electric development in and around Los Angeles; and is expending even larger sums in 1903. Two other companies in northern part of State are developing 169,000 horse-power for long-distance transmission.

Within the decade, ship-building has had great impetus, and California is now third State in the Union in this industry. The Oregon, Olympia, Ohio, and other United States war vessels were built in San Francisco.

Commerce, Navigation, etc.—The position of California (commanding, from the best seaport in 5,000 miles of Pacific coast, the shortest routes to the Orient); its great coast-line,—two thirds of total United States frontage upon the Pacific,—and its relation as outlet for an enormous inland territory, give great importance to its commerce. San Francisco, though ninth city of the Union in population, is third in commerce. Its exports for 1902 were \$47,601,422; imports, \$36,078,270. Operations in the Philippines, and development of the Oriental trade are bringing about for California the realization of Seward's prophecy that "the Pacific is to be the chief theatre of the world's activities." The bay of San Francisco, with a shore-line of 300 miles, open to the ocean only by the mile-wide Golden Gate, and receiving through the two great central rivers the drainage of the vast interior valley, is reckoned next to Sydney among the world's best harbors. San Diego at the extreme south has a well-sheltered natural harbor, entrance to which is now being improved by the government. At San Pedro an enormous breakwater is being constructed by the government, which will enclose an excellent artificial harbor. At the roadstead of Santa Monica, a wharf 4,700 feet long serves rapidly growing commerce. There are several minor ports scattered along the coast. California has seven lines of oceanic steamers—plying to China, the Philippines, Sandwich Islands, Alaska, Mexico, Panama, and Chile, and coastwise. There are six lines of river steamers, five concerned with San Francisco and its river system. The Sacramento is navigable to the capital city of that name,



CORONAIO BEACH, CALIFORNIA

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90 miles from San Francisco; the San Joaquin to Stockton, about an equal distance. The Colorado, on the desert east boundary of the State, is sixth or seventh among the great rivers of North America; and though a sandy, shifting, and impetuous stream is navigable for small steamers for over 300 miles above its mouth in the California Gulf (in Mexico). In 1902 exports by sea from San Francisco included treasure, \$14,851,789; flour and wheat, \$14,458,321. During the same year exports from San Francisco to China were \$15,819,922; to Japan, \$6,858,942.

Fisheries.—San Francisco is now leading whaling port in the world; and despite great decay of this once noted industry there are still about 25 vessels engaged. Product (1902) 10,976 barrels oil; 110,662 pounds whalebone; 15,566 pounds ivory. In 1855 there were engaged in whale fisheries in the Pacific 650 vessels, manned by 15,000 men. In fish canning, California is sixth State in the Union. This is principally salmon pack. Fisheries for local markets employ many hundred people, but statistics are not available. In marine and fresh-water fishes the State is probably richest in the Union. Salmon, sturgeon, rock-fish, smelt, halibut, soles, tom-cod, mackerel, Spanish mackerel, and a great variety of other sea fish are abundant. The barracouta (*Sphyræna argentea*), pompano (*Trachynotus*), sand-dab, red-snapper, and "small fry" are characteristic and famous food fishes; while soles and flounders, differing from those of the Atlantic seaboard, are a noted delicacy. These marine fish are in market the whole year. The leaping tuna of Southern California disputes with the Florida tarpon place as gamiest of sea fish. At Catalina Island there are great annual tournaments for capture of this fish with light rod, reel, and 21-strand line. Tuna of 251 pounds, and black sea-bass, or Jew fish, of 380 pounds, are the record with this frail tackle. The coast is extraordinarily rich in shell-fish. Crabs of extraordinary size, but very delicate; shrimps, crawfish closely resembling the eastern lobster, but without mandibles, are very abundant. The native oyster is small, but flavorful, and eastern oysters transplanted to the coast propagate well and are of excellent flavor. Mussels, clams, razor-shells, cockles, and other edible mollusks are abundant and good. The Rocky Mountain trout is indigenous here, and grows to large size. Within the last 25 years all the eastern varieties of trout have been successfully introduced into this State. Taken altogether, California exceeds any other State in variety, size, and abundance of trout. Black bass, shad, cat-fish, and carp have also been colonized here on a large scale. Game fishes in the streams, as well as game birds and animals, are carefully protected by "close seasons."

Railroads and Street Railways.—Mileage of railroads in the State (1900) 5,500; chiefly pertaining to the two great transcontinental lines, the Southern P., and the Atchison, T. & S. F. R.R.'s. So rapid is the development of electric lines, urban and suburban, that statistics are constantly changing. San Francisco and vicinity have about 400 miles (mostly cable roads in the city and electrics outside). In Los Angeles there are (1903) 170 miles electric roads, with 500 miles of suburban lines in active construction. In 1870, railroad mileage of California

was 525; and there were no urban lines whatever. San Francisco invented in 1873 the first successful urban rapid transit in the world, and its cable system is still probably without rival. A new transcontinental railroad is now building from Salt Lake City to Los Angeles, about 800 miles.

State Finances.—Total assessed valuation, 1902, \$1,290,750,465; in 1890, \$584,578,036. State tax, .382c. Bonded debt nominally, \$2,500,000; but the State owns the bonds. Total county indebtedness, \$3,175,942.

Banks.—In 1900 there were 37 national banks, capital \$10,975,000, total resources \$62,135,611; 178 commercial banks, capital \$26,981,972, total resources \$146,495,782; 53 savings banks, capital \$7,655,705, total resources \$173,872,499; 19 private banks, capital \$890,142, total resources \$2,798,391; grand total, 287 banks; capital, \$46,502,820; total resources, \$385,302,285. In 1902 there were 321 banks, and their net gain in deposits over 1901 was \$55,405,951.

California far exceeds any other State of the Union in average amount deposited in banks to each depositor, with \$764.52 per capita, against the United States average of \$408.30. One in every seven of entire population is a depositor. In clearing-house business, San Francisco stands about sixth city in the Union. Its clearances, 1901, were \$1,134,499,932. Clearances, Los Angeles, 1901, \$145,170,809.

Education.—California leads the Union in enrollment of college students, having 1 to every 419 of total population, and surpasses New England in pro rata of pupils in secondary schools. There are (1900) 5 State Normal Schools, 120 high schools, 7,119 kindergarten, primary, and grammar schools; with grand total of 7,706 teachers, 372,352 scholars; \$19,135,722 value of school property. Annual expenditures for secondary public schools is over \$6,000,000. California is the only State in the Union with two great free universities. The State University at Berkeley ranks second among American universities in number of undergraduates and in total number of students, being exceeded only by Harvard. Total enrollment, 2,470 (1,026 women). It is fourteenth in size among the universities of the world. Resources, \$7,260,000; supported by State tax of 2 cents on every \$100 valuation. Mrs. Phœbe A. Hearst, widow of United States Senator Hearst, has contributed great sums to the university, and has secured in a competition open to all the world (won by M. Benard of Paris), a complete architectural plan whose buildings will cost at least \$10,000,000. Leland Stanford Jr. University was founded 1891 by Gov. and United States Senator Leland Stanford and wife. The widow has recently turned over to the university the complete endowment they designed, amounting to nearly \$30,000,000. A harmonious architectural plan, of symmetry and beauty unrivaled at present by any university in the world, has already been carried far enough to accommodate the 1,200 students (of whom one third are women) and has cost several millions. University affairs in California are in the hands of noted educators from the East; standards are high, and friendly rivalry has done much to promote educational affairs throughout the State; while the two universities have together about five times the enrollment that the one

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had 12 years ago. David Starr Jordan is president of Stanford, and Benjamin Ide Wheeler of the State University. The accrediting system has been developed to high efficiency. Co-education in both universities is not an experiment, but acknowledged success. There is a large number of colleges, private schools, seminaries, academies, and other educational institutions, besides those under State supervision; also medical, law, and other schools. Educationally, California ranks very high in the Union. A large number of distinguished teachers have been attracted by climatic and other considerations. It pays its teachers in public schools the highest average salaries in the Union (\$943, as compared with \$620 for Ohio).

Public libraries are very numerous, and are to be found even in the smallest cities. With its free public library of 80,000 volumes, San Francisco has four other libraries aggregating 200,000 volumes—besides the great Sutro library of 500,000 titles, not yet available to the public. Los Angeles has a library of about 70,000 volumes. In circulation, California libraries are much more active than those of the East. Average number of books distributed per capita: Chicago, .96; Philadelphia, 1.40; Boston, 2.13; Los Angeles, 3.45. Circulation per volume: Boston, 1.76; Los Angeles, 7.40.

Of philanthropic and temperance organizations; of literary, social, fraternal, and other societies, California has an extraordinary number; due to the cosmopolitan character and average education of its immigrants. Women's clubs, the Young Men's Christian Association, the Women's Christian Temperance Union, and other federated bodies are here much stronger than in most States. In proportion to population California has twice as many newspapers as New England. In San Francisco alone are 242 periodicals in 13 languages. The first kindergarten in America was established in San Francisco.

Churches.—No recent statistics available. In 1890 there were 1,505 church buildings, seating capacity, 422,609; value church property, \$12,000,000; number of communicants, 280,619. Of these, 156,846 were Roman Catholics*, about 37,000 Methodists; 19,000 Presbyterians; 11,000 to 12,000 each Baptists and Congregationalists. With increase of 22.9 per cent in population in the decade, these totals have been greatly changed; but probably not the order—nor extensively, the proportions. In 1900 Los Angeles city had one church to every 662 of population, as compared to New York with one church to every 6,424 of population.

Charitable and Penal Institutions.—California has two State prisons, two industrial reform schools, five asylums for insane, one for deaf, dumb, and blind, and a great number of public and private hospitals, asylums, orphanages, etc.

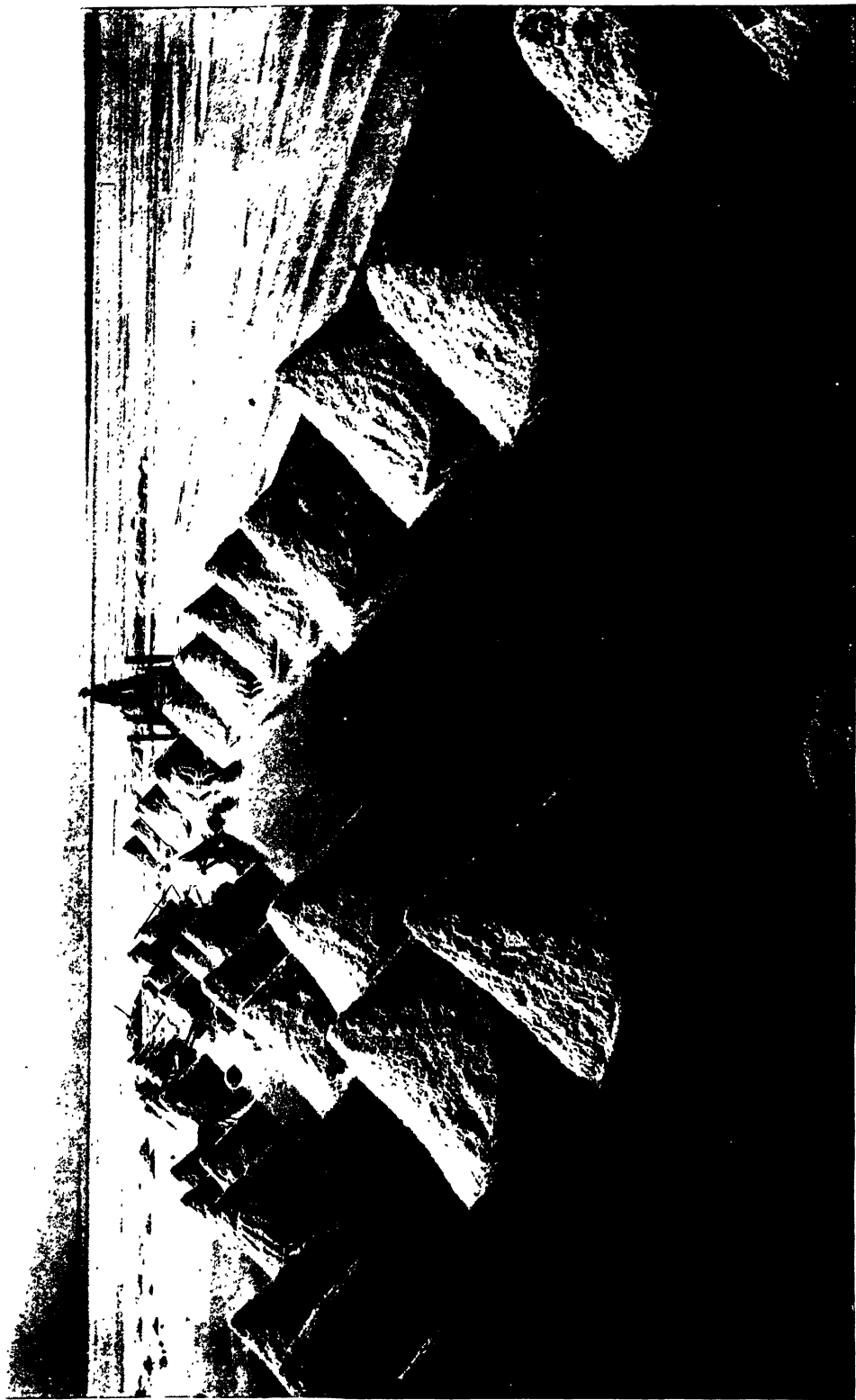
State Government.—State officers elected for four years, except assemblymen for two; no bar to re-election; governor's salary, \$6,000; two thirds vote in each house passes bill over governor's veto. If he does not act on any bill within 10 days, it becomes law, unless adjournment of legislature prevents return of bill, in

which case it becomes operative if within 10 days after such adjournment, the governor approves it. Legislature limited to 40 members in Senate, 80 in House; meets biennially, in January of odd-numbered years. Sessions not limited, but pay allowed members only for 60 days—\$8 per day, with traveling expenses and mileage 10 cents per mile. No bill can be introduced after 50th day of session. State constitution is notable for numerous restrictions on legislative action; provision for three fourths' majority verdict of juries in civil cases; and prohibition of Chinese suffrage and of employment of Chinese on State works or by corporations.

United States Representatives.—Two senators, eight congressmen (prior to apportionment of 1901, seven congressmen). Electoral vote, nine.

Population.—The settlement of California, steadily progressive for 55 years, has been marked by two of the most remarkable shiftings of population anywhere recorded. Everything considered, the "Gold Rush" of 1848-9 has no parallel. In first 12 months after the discovery of a small flake of gold at Sutter's Mill, 42,000 Americans from the far eastern States made their way across the unbroken plains with wagons. This great migration continued uninterruptedly for years. Its demands brought about the first large development of steam navigation; and the finest clipper ships that had ever been built were constructed for the California trade. In 1845 the white population of California was about 5,000; 4,000 of whom were Spanish Californians, 360 Americans, 300 English, Scotch, and Irish, and the remainder "scattering." By 1850 this number had increased to 92,597; by 1860 to 379,994. That is, in 12 years over 370,000 persons reached California by an overland journey of 2,000 miles; or by a voyage of 19,000 miles around the Horn in sailing ships; or by the 5,000-mile voyage by way of Panama, with its difficult passage of the isthmus. For the first decade this precipitate migration was overwhelmingly of men; and this preponderance of males, with dearth of families and of women, colored in almost every social, political, and economic aspect the early fortunes of the State. The scarcity of home life, and profligate abundance of money, brought about an era of luxury in private and public expenditures on such a scale as was then hardly dreamed of in the eastern States. San Francisco had less than 150,000 people when it began to build the largest hotel in the world—covering two and a half acres and costing \$7,000,000. The State had a population of less than half a million during the Civil War, but it contributed more than one third as much to the expenses of the United States Sanitary Commission as all the rest of the "loyal States" together, with their population of 18,500,000. Its cash contribution to this cause was over \$1,200,000. Everything was in this proportion. Enormous subscriptions were sent to relieve great catastrophes of fire, pestilence, or war, in all parts of the world. Huge gifts were made to education and other public utilities, on a scale never yet surpassed and at that time elsewhere unheard of. For a generation San Francisco was a proverb the world over of princely living and princely giving. This large population of young men, vigorous,

* Roman Catholic figures include entire family; other denominations only communicants.



A DRY SALT SEA IN THE COLORADO DESERT, CALIFORNIA.
The Indian laborers have washed the salt and stacked it into cones ready for the mill.

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adventurous, mostly unattached, far from home and the conventions, and under excitation of sudden wealth, shaped and established such an epoch, social and financial, as no other American State has ever comparably known.

It was only after the first decline in the "diggings"—after the pursuit of gold became less a fortuitous scramble for surface nuggets, and mining had come to demand skill, patience, and business methods—that attention began to be paid to the soil. Though for 80 years, already the Franciscan missionaries had proved, in little oases about their missions, the wonderful fertility of California, the aridity of climate and the "look" of the land, so unlike in color and texture to soils recognized as fertile at home, led the adventurers to believe for years that California was worthless except for mining and stock-raising. It was only when the real fecundity of the soil began to be understood that character of population underwent essential change. Immigration in the first decade was almost purely of male fortune-hunters, with no thought of permanent residence. They came to get rich and go home. But when the slow comprehension dawned that in agricultural possibilities the State was inconceivably richer than in mineral resources, and that here was not only the most hospitable of climates, but the most generous land for home-building, an entirely different type of migration began—the migration of families. This stream, small at first, has continued steadily since about 1870. In 1886 the completion of a competing railroad into southern California—to which its first transcontinental line had brought but slow increase of population or development—precipitated another migration numerically greater than the Gold Rush, almost as rapid, far longer continued, and of entirely different category. It was characteristically of well-to-do and educated families, without the heroic qualities of the pioneers, but of much higher average in the civic and financial scale. They came not to tame a wilderness, but to enjoy such a land as travelers seek along the Mediterranean. They came by Pullman cars instead of "prairie schooner"; instead of felling forests they planted groves of tropical fruits; instead of building frontier cabins, they erected a class of homes such as probably cannot be found among an equal population. It is only by reference to the peculiar character of this migration that the development and progress of California in all social, educational, and material lines during the last 15 years seems at all credible.

In 1880 the population was 864,694; in 1890, 1,208,130; in 1900, 1,485,053; the latter figure being more than 16 times as large as the population of 1850. The recent great increase in population, however, has been disproportionately in the seven southern counties of the State. Much more than half of the State gain for 20 years has been in eight counties, including in the northern half of the State only the city and county of San Francisco. Since 1880, Los Angeles has outstripped in population 99 other American cities then numerically larger. In 1900 it was thirty-sixth city in the Union had gained as many people in the decade. There are 57 counties, with 116 incorporated cities and towns; 19 places exceeding 5,000 population;

10 exceeding 10,000; and 4 exceeding 25,000. Of the total population of 1,485,053, whites are 1,402,727; colored, 11,045; Chinese, 45,753; Japanese, 10,151; Indians, 15,377. The total males are 820,531; females, 664,522. While in most of the far eastern States the excess of females to males is increasing, in California the growth is toward a balance; the number of women to every 100,000 men having risen from 72,657 in 1890, to 80,987 in 1900. Of the total population, 1,117,813 are native born, and 367,240 foreign.

The 15,377 Indians in California, comprising at least 14 different linguistic stocks, live principally on three reservations in the north; 1 at Yuma, and 32 mission reservations, all on the edge of the desert in the south. They are mostly self-supporting, peaceful, and fairly industrious farmers, with government day schools everywhere among them; besides which, 2,934 Indian children are in public schools. Their chief art is basket-making, in which some tribes lead the world for beauty and value of product. The record price for a basket is \$2,000; but prices average from \$5 to \$50. The government is now encouraging this industry by teaching it in Indian schools.

Chief Cities.—San Francisco, largest city west of Saint Louis (about 2,000 miles by rail) and largest on entire Pacific coast of North and South America; has population (1900), 342,782, a gain of 43,785 in the decade. It is ninth city in the Union in population and twentieth in increase in the decade. The population was 2,000 in February 1849; 5,000 in July; 20,000 in December of same year. In 1850 it was about 25,000 (United States census figures destroyed by fire). In 1860 it was 56,802; in 1870, 149,473; in 1880, 233,959. Los Angeles was, in 1880, 135th city in the Union in population; in 1890, 57th; in 1900, 36th, having gained in the last decade 52,089, which makes it 14th city in gross increase. In 1850 it had 1,610 inhabitants; in 1860, 4,385; in 1870, 5,728; in 1880, 11,183; in 1890, 50,395; in 1900, 102,479. In 1902 it was fifth city in Union in number of new buildings erected, and eighth in value of new buildings; first in expenditure per capita for new buildings. It has the largest proportionate telephone service in the world, with 1 telephone to every 8 persons; San Francisco coming next with 1 to every 12 persons; then Detroit with 1 to every 24,—as compared with Boston 1 to every 31, New York 1 to every 41, Chicago 1 to every 44. Oakland, across the bay from San Francisco, has grown from 48,682 in 1890 to 66,960 in 1900; Sacramento, State capital, has 29,282 population. Other cities are San José, 21,500; San Diego, 17,700; Stockton, 17,506; Alameda, 16,464; Berkeley (seat of State university, and Asylum for Deaf, Dumb, and Blind), 13,214; Fresno, 12,470; Pasadena, 9,117; Riverside, 7,973; Vallejo, 7,965; Eureka, 7,327; Santa Rosa, 6,673; Santa Barbara, 6,587; San Bernardino, 6,150; Santa Cruz, 5,659; Pomona, 5,526. No other place exceeded 5,000 in 1900.

History.—The name California, for which so many preposterous derivations have been urged, is taken from a Spanish romance, called 'Sergas de Esplandian' ('Exploits of Esplandian') by Ordoñez de Montalvo (translator of Amadis de Gaul), printed about 1510, and often mentioned in old sources. It was a mythi-

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cal island "on the right hand of the Indies, very near the Terrestrial Paradise," peopled with Amazons and Griffins. The name was first applied to the peninsula (discovered by Jimenez 1533) and is first recorded thus in Preciado's diary of Ulloa's coastwise voyage in 1539. In time it came to be used indefinitely for the whole Pacific coast from the peninsula practically to Nootka; and later "the Californias," differentiated into Baja (or Lower) California and Alta (Upper) California, the former including about what is now the Mexican Peninsular Territory. The first European to touch the present State was Alarcon, who went up the Colorado River some hundreds of miles in 1540. The first seaboard exploration was by Cabrillo 1542; and the next important coast explorations were by Sir Francis Drake 1579, and Vizcaino 1602. The first colonization of Upper California was by the Franciscan missionaries under Junipero Serra, with a small escort of Spanish troops. These pioneer missionaries had by 1800 founded 18 missions, whose total population, mostly Indian neophytes, was 13,000. Three other missions were established by 1823. The mission period lasted about 65 years; converted over 80,000 Indians; erected in the wilderness at least \$1,000,000 worth of buildings, and had developed stock-raising and wheat on a scale which astonished Humboldt. In 1834 the Mexican government "disestablished" the missions and confiscated their property. The Indians were scattered, and perished in great numbers. The buildings were plundered and left to decay. At present the Landmarks Club (incorporated) is preserving the mission edifices. The State passed from Spanish rule to that of the Mexican republic, 1821; was seized, practically without resistance, by the United States in 1845, and ceded by Mexico at close of Mexican war; admitted to the Union, 9 Sept. 1850. The American discovery of gold caused an unprecedented transcontinental migration (see *Population*). Aside from the great impetus given steam and clipper ships, the migration had other unique features—like the Merchant's Express, which employed 5,000 men, 2,000 wagons, and 20,000 yoke of oxen in freighting across the continent; and the Pony Express, which carried mail (letters only) at \$5 per half ounce, 1,950 miles horseback from Independence, Mo., to San Francisco, in 10 days; and the Butterfield stages, 8 times a month between St. Louis and San Francisco, via Texas and New Mexico; quickest time, 21 days from New York to San Francisco. Extraordinary records were made in this overland traffic. Robert H. Haslam, ("Pony Bob") made one continuous ride of 380 miles; and William F. Cody ("Buffalo Bill") one of 384, without stopping except for meals and to change horses—both as riders of the Pony Express. Quickest time made by this route (1,950 miles), 7 days, 17 hours. The growth of this overland traffic led California capitalists, heavily subsidized by government, to build a transcontinental railroad. Ground was broken at Sacramento for the Central P. R.R., 8 Jan. 1863. The road was completed by driving of a spike of pure California gold by Gov. Stanford in presence of distinguished company at Promontory, Utah, 10 May 1869. In 1877 the Southern P. R.R. from Texas tidewater to San Francisco was completed. In 1885 the

Atchison, T. & S. F. R.R. reached Los Angeles from St. Louis; and within the last two years has been extended to San Francisco. The latter and the Southern P. R.R. are the longest railroad systems in the world, each with a mileage much over 7,000. The modern development of California dates from competition of these two lines during the decade beginning 1886.

The swift creation of an American commonwealth by the sudden horde of adventurous pioneers upon whom that duty at once devolved, is perhaps the most remarkable monument to the genius of the American people for self-government. Ninety thousand wanderers, homeless, wifeless, and chaotic in the wilderness, fevered by enormous and sudden gains, without cities or laws or communication with the outside world, within a year installed soberly and firmly all essential machineries of an American State. The desperadoes who flocked in from all parts of the world—including a large contingent of Australian convicts—were firmly suppressed, though not at once. Between 1849 and 1856 there were in San Francisco alone 1,000 homicides and 7 executions. In 1856 the second vigilance committee, composed of the best citizens, judicially, after full and formal trial, publicly hanged half a dozen worst desperadoes, and banished scores of others on pain of death. Since that time life and property have been quite as safe in California as in the eastern States. Chinese exclusion, though finally a national measure, was brought about by California, which then contained a majority of all Chinese in this country. In 1879 California voted exclusion by 154,638 to 883. The number of Chinese in the State has decreased from 75,132 in 1880 and 72,472 in 1890 to 45,753 in 1900. The bitterness aroused by the exclusion struggle has passed, and Chinese are well treated.

California entered the Union as a free State, thus giving balance of power to the North. In State elections since the war it has been peculiarly independent, having gone Democratic in 1867, 1875, 1882, 1886 (Democratic governor and Republican lieutenant-governor, who became governor by his superior's death) and 1894; Republican in 1871, 1879, 1890, 1898, and 1902.

Next to the gold excitement (see *Mining and Population*) the most sensational era in California history was the great bonanza silver period from 1859 to 1880. The mines were in Nevada, but were owned in San Francisco, and an era of stock-gambling theretofore unheard of in history, and probably not yet surpassed, sprang from their sensational yield. Stocks on the San Francisco board rose \$1,000,000 a day for many months, and sales in one year were \$120,000,000. Everybody gambled in stock, from bankers to scrub-women. In 1875, with less than 200,000 population, San Francisco had 100 millionaires. The "Consolidated Virginia" mines paid \$1,000,000 per month dividends for nearly two years. One lode was valued at nearly \$400,000,000; \$250,000,000 was spent in "developing" a small group of hills. The decadence of these great bonanzas, following the subsidence of gold mining to sober methods, at last turned more general attention to agriculture, the real wealth of the State (see *Agriculture*). In 1880 California was first in the Union only in gold, sheep, and quicksilver; all other industries being far down the list. It is

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now second in gold; ninth in sheep; first in diversity of crops; first in wines, total fruits, canned fruits, dried fruits, barley; first in number of irrigated farms; first in average wages in manufacturing establishments; first in borax, asphalt, quicksilver, platinum; second in copper; third in wheat; second in beet sugar; second in hops; first in oranges, lemons, olives, and all semi-tropic fruits, honey, prunes, walnuts, almonds, beans, grapes, pears, peaches, cherries, apricots, etc.; first in electric power transmission; third in ship-building; fourth in petroleum; fifth in total value products per farm; eleventh in value farm products per capita; twelfth in total value manufactured products.

The highest California gold product in any one year was \$85,000,000. The total agricultural products for 1899 were \$131,000,000; and total value of manufactured products (1900) \$302,000,000.

A South Sea bubble as wild as the Comstock silver stock-craze was the great "Land Boom" of southern California, 1886-7; a period of land-gambling never quite equaled in any other part of America. An area as large as New England was involved, with varying intensity; but the chief focus of excitement was in Los Angeles, San Bernardino, and San Diego counties. Scores of thousands of city lots were staked out far from towns, hundreds of miles of cement sidewalks and curbs were laid; scores of big hotels and other buildings erected as baits, and great quantities of lands (purchased at from \$10 to \$30 per acre) were sold in town lots at \$1,000 to \$10,000 per acre. In Los Angeles County alone, with a population then not over 50,000, real estate transfers recorded in 1887 were over \$100,000,000. Excursion auction sales of new "towns" sometimes realized \$250,000 in a day; and \$100 was often paid for place in the line waiting for a sale to open. The collapse of this gigantic bubble, early in 1888, was as extraordinary in its freedom from disaster as it had been in its inflation. Not a bank failed, nor a business house of respectable standing; and while desert town lots reverted to acreage and acreage values, all really desirable real estate, rural and urban, has constantly advanced in value every year—thanks to the uninterrupted continuance of large and wealthy immigration. Building of homes and setting out of orchards continue on an extraordinary scale. During 1902, besides other buildings, more than 4,000 new residences were erected in the city of Los Angeles. "Local option" is in force; and nearly all towns of southern California are "prohibition."

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CHAS. F. LUMMIS.

California, Gulf of, or Sea of Cortez, an arm of the Pacific Ocean, separating lower California from the Mexican mainland. It is 700 miles in length and varies in width from 40 to 100 miles. There is but little navigation carried on there. On the western coast are pearl fisheries. The gulf was discovered by Cortez, and for some time was called after him. The river Colorado empties into the northern extremity.

California, Lower or Old, a territory of the Republic of Mexico, forming a peninsula in the Pacific Ocean, united on the north to the continent, from which it is separated on the east, throughout its entire length, by the Gulf of California. It is about 750 miles in length, and in different places 30, 60, 90, and 150 miles wide. The coast forms many capes, bays, and havens, and is fringed by numerous islands. A chain of mountains extends throughout, of which the greatest height is from 4,500 to 4,900 feet above the sea, the latter being the height attained by its culminating point, Cerro de la Giganta. The chain is almost destitute of vegetation, having only here and there a few stunted trees or shrubs. It has a single volcano, and possesses distinct traces of volcanic origin. The foot of the range is covered with cactuses of remarkable size. Some of the hollows, where the soil is formed of decomposed lava, are tolerably fertile. On the plains the soil is often of the richest quality, and when the advantage of irrigation can be obtained, raises the most abundant crops; but this advantage often fails, owing to the great deficiency of water. Rain seldom

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falls in summer, and the streams are very insignificant. The climate varies much according to locality. On the coast of the Pacific the temperature ranges in summer from 58° to 71°; the sky is peculiarly clear and perfectly cloudless, except toward sunset, the tints of which are remarkable for variety and beauty. At a distance from the coast, where the sea breeze is not enjoyed, the summer heat is excessive. The principal vegetable products are maize, manioc, wheat, grapes, oranges, lemons, pineapples, and many other varieties of the finest fruits. In the valleys horses, sheep, and cattle are raised successfully. The fish on the coast are very abundant, and a pearl-fishery was long very successfully carried on. Gold mining is also carried on with considerable success. La Paz, in the south, is the capital; Ensenada, in the north, is a rising port. California was explored by order of Cortez in 1532-3. The region was visited by Drake as early as 1579. In 1697 the Jesuits formed establishments in the territory, built villages and missions, and in some measure civilized the natives. On their expulsion in 1767, the missions were carried on by the Dominicans. Pop. (1895) 42,245, of whom half are Indians.

California Poppy. See ESCHSCHOLTZIA.

California, University of, an important university which is a part of the State educational system of California. It was established in 1868, and instruction begun in 1869, when the College of California was united with it. The professional schools were contemplated in the original plan, but not organized till later. The governing body consists of the governor and lieutenant-governor of the State, the speaker of the Assembly, the State superintendent of public instruction, the presidents of the State Agricultural Society and the Mechanics' Institute of San Francisco, and the president of the university (all members *ex officio*), and 16 others appointed by the governor with the advice and consent of the Senate. The university is divided into the following departments: (1) the colleges of general culture, including letters (degree of bachelor of arts), social science (bachelor of letters), natural sciences (bachelor of science), and commerce (degree not yet decided); (2) the colleges of applied science (leading to the degree of bachelor of science); (3) the Mark Hopkins Institute of Art; (4) the Hastings college of law; (5) the medical department; (6) the post-graduate medical department; (7) the college of dentistry; (8) the California college of pharmacy; (9) the veterinary department. The first two departments are situated at Berkeley; the others are at San Francisco; the Lick observatory on Mount Hamilton also became a part of the university in 1888.

In 1896 Mrs. Phœbe Apperson Hearst informed the regents that she proposed to erect two buildings, but wished first a general worthy plan secured for the Berkeley campus, and that she would bear the expense of an international competition to obtain such a plan. In 1898 an international jury assembled at Antwerp and voted upon more than 100 plans submitted, awarding prizes to 11 competitors, who were invited to visit the university and to prepare revised plans for a second competition. In September 1899, the jury met again in San Francisco and gave the first prize (\$10,000) to

M. Emile Bénard of Paris. After a long stay in Berkeley and many conferences with the university authorities, he undertook a revision of his drawings to fit the plans to the actual necessities of the site and the prospective needs of the university. In December 1900, he submitted a design which the regents formally adopted as the permanent plan, from which no important change may be made except with the approval of a self-perpetuating board of architectural advisers, comprising the jurors and other architects of high reputation. To Mr. John Galen Howard of New York has been entrusted the first work of construction. He is now at work on designs for the mining building, which will be the first to be erected. The cost of carrying out the whole plan will be from \$10,000,000 to \$12,000,000, and the work cannot be completed in less than a generation. Mrs. Hearst has also made provision for the annual expenditure of \$30,000 or more on excavations and purchases in Egypt, Greece, Peru, New Mexico, and the Philippines, for the archaeological museum of the university. Other recent gifts are \$75,000 to endow a chair in classical literature, \$10,000 for two book funds (both from Mrs. Sather), and \$24,000 from D. O. Mills, to defray the expenses of a two years' expedition from the Lick observatory to an observing station in the southern hemisphere. In March 1901 the State legislature increased the income of the university by \$100,000 per annum, raising the total from all sources, including the income from special funds, such as that for the support of the great Lick observatory and the Wilmerding Trades School, to \$575,000 a year. As the university is a State institution, tuition is free for residents of California in the colleges of general culture; non-residents pay a small fee; and the professional schools are supported by fees. In 1902 there were 4,006 students in all the departments, of whom about one half were women; it is also to be noted that a comparatively large proportion of students are in the general or academic courses, as distinguished from the technical and professional courses. The number of professors and instructors in 1902 was 481. The president is Benjamin Ide Wheeler, LL.D., formerly a professor at Cornell.

Calig'ula, Caius Cæsar Augustus Germanicus, Roman emperor, a son of Germanicus and Agrippina: b. 31 Aug. 12 A.D., in the camp at Antium, and brought up among the legions; d. 24 Jan. 41 A.D. He received from the soldiers the surname of Caligula, on account of his wearing the *caligæ*, a kind of little boots in use among them. He understood so well how to insinuate himself into the good graces of Tiberius that he not only escaped the cruel fate of his parents, and brothers, and sisters, but was even loaded with honors. Whether, as some writers inform us, he removed Tiberius out of the way by slow poison is uncertain. When the latter was about to die he appointed, according to Suetonius, Caligula and the son of Drusus, Tiberius Nero, heirs of the empire. But Caligula, universally beloved for the sake of his father Germanicus, was able without difficulty to obtain sole possession of the throne. Rome received him joyfully, and the distant provinces echoed his welcome. His first actions were just and noble. He interred, in the most



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honorable manner, the remains of his mother and of his brother Nero, set free all state prisoners, recalled the banished, and forbade all prosecutions for treason. He conferred on the magistrates free and independent power. Although the will of Tiberius had been declared by the senate to be null and void, he fulfilled every article of it, with the exception only of that above-mentioned. When he was chosen consul he took his uncle, Claudius, as his colleague. Thus he distinguished the first eight months of his reign by many magnanimous actions, when he fell sick. After his recovery, by a most unexpected alteration, which has given good grounds to suspect his sanity, he suddenly showed himself the most cruel and unnatural of tyrants. The most exquisite tortures served him for enjoyments. During his meals he caused criminals, and even innocent persons, to be stretched on the rack and beheaded: the most respectable persons were daily executed. In the madness of his arrogance he even considered himself a god, and caused the honors to be paid to him which were paid to Apollo, to Mars, and even to Jupiter. He also showed himself in public with the attributes of Venus and of other goddesses. He built a temple to his own divinity. At one time he wished that the whole Roman people had but one head, that he might be able to cut it off at one blow. He frequently repeated the words of an old poet, *Oderint dum metuant*—"let them hate so long as they fear." He squandered the public money with almost incredible prodigality. One of his greatest follies was the building of a bridge between Baie and Puteoli (Pozzuoli), in order that he might be able to boast of marching over the sea on dry land. He had it covered with earth, and houses built on it, and then rode over it in triumph. He gave a banquet in the middle of the bridge, and to celebrate this great achievement ordered numbers of the spectators whom he had invited, to be thrown into the sea. On his return, he entered Rome in triumph, because, as he said, he had conquered nature herself. After this, he made preparations for an expedition against the Germans, passed with more than 200,000 men over the Rhine, but returned after he had traveled a few miles, and that without having seen an enemy. Such was his terror, that, when he came to the river, and found the bridge obstructed by the crowd upon it, he caused himself to be passed over the heads of the soldiers. He then went to Gaul, which he plundered with unexampled rapacity. Not content with the considerable booty thus obtained, he sold all the property of both his sisters, Agrippina and Livilla, whom he banished. He also sold the furniture of the old court, the clothes of Marcus Antoninus, of Augustus, Agrippina, etc. Before he left Gaul, he declared his intention of going to Britain. He collected his army on the coast, embarked in a magnificent galley, but returned when he had hardly left the land, drew up his forces, ordered the signal for battle to be sounded, and commanded the soldiers to fill their pockets and helmets with shells, while he cried out, "This booty, ravished from the sea, is fit for my palace and the capitol!" When he returned to Rome, he was desirous of a triumph on account of his achievements, but contented himself with an ovation. Discontented with the senate, he resolved to destroy

the greater part of the members, and the most distinguished men of Rome. This is proved by two books which were found after his death, wherein the names of the proscribed were noted down, and of which one was entitled *Gladius* (Sword), and the other *Pugillus* (Dagger). He became reconciled to the senate again when he found it worthy of him. He supported public brothels and gaming houses, and received himself the entrance money of the visitors. His horse, named *Incitatus*, was his favorite. This animal had a house and a servant, and was fed from marble and gold. Caligula had caused him to be admitted into the college of his priests, and was desirous of making him a consul also. He even had the intention of destroying the poems of Homer, and was on the point of removing the works and images of Virgil and Livy from all libraries: those of the former, because he was destitute of genius and learning; those of the latter, because he was not to be depended upon as a historian. Caligula's morals were, from his youth upward, corrupt. After he had married and repudiated several wives, Cæsonia retained a permanent hold on his affections. A number of conspirators, at the head of whom were Chærea and Cornelius Sabinus, both tribunes of the prætorian cohorts, murdered him in the 29th year of his age, and the fourth of his tyrannical reign, which thus lasted from 37 to 41 A.D.

Cal'ipers, Caliper Compasses, a sort of compasses with arched legs, used to take the diameter of any round body, as of shot or shells, the bore of ordnance, the thickness of timber, etc. There are various forms and modifications of the instrument according to the special purpose for which it is intended. Gunners' calipers are engraved with sets of numbers connected with artillery.

Ca'liph (successor, successor and representative) is the name assumed by the successors of Mohammed in the government of the faithful and in the high-priesthood. Caliphate is therefore the name given by historians to the empire of these princes which the Arabs founded in Asia, and, impelled by religious enthusiasm, enlarged, within a few centuries, to a dominion superior in extent to the Roman empire. The title is still borne by the Sultan of Turkey. Mohammed, in the character of the prophet of God, made himself the spiritual and temporal ruler of his people. In the following account the dates both of the Hegira and the Christian year are often given. The difference in the mode of computing the Mohammedan year has caused considerable divergencies among authorities in regard to the exact dates of the particular events of Mohammedan history.

After the death of the Prophet the election of a successor occasioned considerable excitement, Mohammed having left no son and nominated no successor. Abdallah Ebn Abu Koafas, called Abubekr, that is, father of the virgin (because his daughter Ayesha was the only one of the wives of Mohammed whom he had married as a virgin), obtained the victory over Ali, the cousin and son-in-law of Mohammed, and became the first caliph, 632 A.D. (year of the Hegira 11). Victorious over enemies at home, by the aid of his general Khaled, "the Sword of God," he proceeded, as the Koran directs, to spread the doctrines of Mohammed by arms

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among the neighboring nations. With the watchword conversion or tribute, a numerous army, consisting entirely of volunteers inspired with zeal for the holy war, penetrated into Syria and Mesopotamia, but before much could be done, Abubekr died after he had filled the place of the Prophet two years and four months.

Omar, another father-in-law of the Prophet, now became second caliph, and under him the war was continued. The Moslems having once acquired a strong footing in Syria by the treacherous surrender of Bosra, they undertook, under Khaled, the siege of Damascus, and having repulsed two large armies, sent by the Emperor Heraclius to the relief of the city, they obtained possession of it by a capitulation (635 A. D.), the terms of which were perfidiously broken, Khaled pursuing and slaughtering the retreating Christians. By him and other generals, though not without a brave resistance on the part of the Greeks, the subjugation of Syria was completed (638 A.D. of the Hegira 17). Jerusalem having been compelled to surrender (636 A.D., Heg. 15), Omar proceeded thither in person to fix the terms of capitulation, which subsequently served as a model in settling the relations of the Moslems to the subject Christians. These terms were carefully observed by the conscientious caliph. The new Persian empire of the Sassanidae was also overthrown, and Mesopotamia and other extensive regions overrun. Equally successful was the Mohammedan general, Amru, in Egypt, which was subjected to the caliphate in two years (641). Omar was the first who bore the appellation of Emir al Moumenin ("Prince of the Faithful")—a title inherited by all succeeding caliphs. Many of these conquests were over Christian populations who readily changed their creed and adapted themselves to the new rule.

After the murder of Omar by a revengeful slave (644 A.D., Heg. 23), a council, appointed by him on his death-bed, chose Osman, or Othman, son-in-law of the Prophet, passing over Ali. Under him the empire of the Arabs continued to expand. From Egypt the tide of conquest advanced westward along the northern coast of Africa, as far as Ceuta. Cyprus too (647 A.D.), and Rhodes (654 A.D.) were conquered; but the former was lost again two years after. An agitation against Othman now arose, partly owing to the fact that he favored and aggrandized his own family connections in every way, and intrusted the provinces, not to the most capable, but to his favorites. To many also the claims of Ali to the caliphate were deemed superior to those of Othman. The dissatisfaction thus excited occasioned a general insurrection in the year 656 (Heg. 34), which terminated in Othman's death.

Ali, the son-in-law of the Prophet by Fatima, became the fourth caliph, by the choice of the people of Medina, and is regarded as the first legitimate possessor of the dignity by a numerous sect of Mohammedans, which gives him and his son, Hassan, almost equal honor with the Prophet. This belief prevails among the Persians, and others who belong to the Shiite sect as opposed to the Sunnites or orthodox. Instead of being able to continue the conquests of his predecessors, Ali always had to contend with domestic enemies. Among these was Ayesha, the widow of the Prophet, called the

mother of the faithful; also Tellah, Zobeir, and especially the powerful Moawiyah, governor of Syria, who all laid claim to the government. These were able to create suspicion, and spread the report that Ali had instigated the murder of Othman. In vain did he endeavor to repress the machinations of his enemies by intrusting the government of the provinces to his friends. Nowhere were the new governors received. The discontented collected an army, and made themselves masters of Bassora. Ali defeated it, and Tellah and Zobeir fell; but he could not prevent Moawiyah and his friend Amru from extending their party and maintaining themselves in Syria, Egypt, and even in a part of Arabia. Three men of the sect of the Kharejites proposed to restore concord among the faithful, by slaying each one of the three heads of the parties, Ali, Moawiyah, and Amru; but Ali only fell (661 A.D., Heg. 40). He was a man of a cultivated mind, and was the author of a collection of sentences or moral maxims, etc. His son, the mild, peaceful Hassan, had no desire to defend the caliphate against the indefatigable Moawiyah; a treaty was concluded between the two, by which Hassan solemnly abdicated the government (661). Some years later he perished by poison, said to have been administered by one of his wives at the instigation of Moawiyah.

Moawiyah I. transferred the seat of the caliphate from the city of the Prophet, Medina, where it had hitherto always been, to Damascus, in the province of which he had formerly been governor (673 A.D., Heg. 54). With him began the series of the caliphs called Omniades (or Ommayyads), which name this family bore from Moawiyah's progenitor, Ommiyah. Not long after his accession he was obliged to quell an insurrection of the Kharejites by a campaign, and a rebellion at Bassora by severe punishments. He then seriously meditated the entire subversion of the Byzantine empire (q.v.). Rhodes was attacked, and the famous colossus was broken in pieces. His son Jezid marched through Asia Minor, meeting but little resistance; then crossed the Hellespont and laid siege to Constantinople, but was obliged to raise it (669 A.D., Heg. 49). Other generals were more successful against the Turks in Khorasan, and the regions extending to the borders of India.

The next caliph, Jezid (or Yazid), was not altogether a worthy successor of his father, the politic Moawiyah (680 A.D., Heg. 60). At first he was not acknowledged by the two holy cities, Mecca and Medina, which, as long as the caliphs had resided in the latter city, had enjoyed a principal voice in their election, but which had not been consulted when Moawiyah, according to the custom of the caliphs, appointed his successor in his lifetime. The discontented espoused the cause, either of Housain, the famous son of Ali, or of Abdallah, Zobeir's son, both of whom had laid claim to the caliphate. A rebellion of the inhabitants of Irak, in favor of Houssain, led by Moslim, Houssain's cousin, was suppressed by the prudence and decision of Obeidallah, governor of Cufa; and Houssain, who had accepted the invitation of the conspirators, was killed (680 A.D., Heg. 61), to the great grief and rage of all those who took part with Ali's family—a feeling still cherished by the Shiites. Abdallah

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Ebn Zobeir was recognized as caliph in Medina, where Jezid was detested for his voluptuousness and scepticism. On this account Medina was invested, stormed, and sacked; and Mecca, in which Abdallah took shelter, was besieged, but during the siege Jezid died.

After Jezid's death (683 A.D., Heg. 64) his son, Moawiyah II., a weak but pious youth, became caliph, but after a reign of 40 days he died when he was meditating abdication. By this time Abdallah Ebn Zobeir had caused himself to be proclaimed as Prince of the True Believers, and he had a powerful following. For a period anarchy prevailed. Irak, Hejaz, Yemen, and Egypt acknowledged Abdallah Ebn Zobeir as caliph. In Syria, Dehac, regent to Abdallah, was at first chosen caliph; but the people of Damascus appointed Merwan I., of the race of the Ommiades, caliph, who made himself master of all Syria and Egypt. Khorasan separated from the caliphate, and submitted to a prince of its own choosing—the noble Salem. In the following year (684 A.D., Heg. 65) Soliman Ebn Sarad excited a great rebellion of the discontented in Syria and Arabia, and pronounced both caliphs deposed, but was defeated by the experienced soldier Obeidallah. Merwan (who died in 685) had been compelled to promise on oath to leave the caliphate to Khaled, the son of Jezid, yet he nominated his son Abdalmelek as his successor. Under him (685 A.D., Heg. 65) Mokthar, a new rebel against both caliphs, was subdued by one of them, Abdallah (686 A.D., Heg. 67); but this only made Abdallah more formidable to Abdalmelek, who, in order to be able to direct all his forces against him, concluded a peace with the Greek emperor, Justinian II., in which, reversing the order of the Koran, he conceded to the Christians a yearly tribute of 50,000 pieces of gold. He then marched against Abdallah, defeated him twice, and took Mecca by assault. In this last conflict Abdallah fell. Thus Abdalmelek united under his dominion all the Mussulmans; but the resistance of governors and wars with the Greeks kept him constantly occupied. He was the first caliph that caused money to be coined. He died 705 A.D. (Heg. 86). Under Walid I., his son, the Arabs conquered in the east Charasm and Turkestan (707 A.D., Heg. 88); in the north Galatia (710 A.D.); and in the west Spain (711 A.D.). (See SPAIN.) He died in 716 (Heg. 97). His brother and successor Soliman besieged Constantinople, but his fleet was destroyed by Greek fire, and his army suffered severely from famine. He died while on his way to take part in the siege in 717 (Heg. 99).

Omar II., his successor by Soliman's last will, was equally unsuccessful in the conduct of the war. Having incurred the displeasure of the Ommiades by his indulgence toward the sect of Ali, he was poisoned by them (721 A.D., Heg. 102). Jezid II., his successor also by the disposition of Soliman, died of grief for the loss of a female favorite, of whose death he was the author (723 A.D., Heg. 104). His successor was Hisham, who reigned till 743. He had to suppress several revolts, the chief being that of Zaid (739-40). About this time the Abbassides, descendants of Abbas, son of Abdalmotaleb, uncle of the Prophet, began to be formidable. Under Hisham an end was put to the progress of the Saracens in the west by the

energy of Charles Martel, who annihilated their armies at Tours in 732, and at Narbonne in 736. Walid II. was murdered after a reign of one year (744 A.D., Heg. 124).

After the still briefer reigns of Jezid III. and of his brother Ibrahim, Merwan II. followed, with the surname (respectable among the Arabs) of the Ass (Al Hemar). Ibrahim, the Abbasside leader, being imprisoned and put to death by this prince, his brother, Abul Abbas, took up the cause of the Abbassides and assumed the title of caliph. In the resulting war Merwan was twice defeated, and fell (750 A.D., Heg. 133). With him terminates the series of caliphs of the race of Ommyyah. The furious Abdallah, uncle of Ibrahim and Abul Abbas, treacherously destroyed almost all the Ommiades by a horrible massacre at a meeting to which they had been inveigled. One of the family, Abderrahman, grandson of Hisham, having taken refuge in Spain, escaped the massacre and founded the independent caliphate of Cordova. See SPAIN.

Abul Abbas, first of the Abbasside caliphs, died young in 754 A.D. (Heg. 136). His brother, Abu Giafar, called Al Mansur ("the Victorious"), was obliged to contend with a rival in his uncle, Abdallah, whom he, however, overcame. He acquired his surname by his victories in Armenia, Cilicia, and Cappadocia. Spain was lost by him, however, as well as Africa. In the year 764 he founded the city of Bagdad on the Tigris, and transferred thither the seat of the caliphate (768 A.D., Heg. 149). He died on a pilgrimage to Mecca, leaving immense treasures (775 A.D., Heg. 158). Mohammed Mahdi, his son and successor, a man of a noble character, had to contend with the turbulent inhabitants of Khorasan under the pretended prophet, Ilakem, and died 785 A.D.; and Musa or Hadi, his grandson, met with the same opposition from the Ali party under Houssain. Hadi's mother was a strong-minded, ambitious woman, who wished to rule her son, and with him the state, and this led him to try to poison her. She, however, caused him to be smothered before he could effect his purpose.

Hadi was followed, not by his son, but by his brother Harun (786 A.D.), who was denominated Al Rashid ("The Upright") on account of his justice, and is famous for promoting the arts and sciences. He concluded a truce (an actual peace could never be made with Christians) with the Greek empress, Irene (788 A.D.), who consented to pay him tribute. Yahya, a member of the house of Ali, disputed with him the possession of the throne, but subsequently submitted. Harun, however, tarnished his reputation by the murder of Yahya, and still more by the murder of his sister, and her favorite the Barmecide Giafar, and by the expulsion and persecution of the whole family of the Barmecides, whose services to the state and himself had been of very great value. Harun divided the empire among his three sons. Al Amin, as sole caliph, was to reign over Irak, Arabia, Syria, Egypt, and the rest of Africa; under him Al Mamun was to govern Persia; Turkestan, Khorasan, and the whole East; and Motassem was to rule Asia Minor, Armenia, and all the countries on the Black Sea. The younger brothers were to succeed Amin in the caliphate. At Thus, in Khorasan, through which Harun was passing, in order to quell a rebellion that had

broken out in Samarcand, he was arrested by death, of which he had been forewarned by extraordinary dreams (809 A.D., Heg. 190).

Al Amin the faithful (his proper name was Mohammed) was undeserving of this name. Untrue to his obligations as a ruler, and addicted to all kinds of sensuality, he left the discharge of his duties to his vizier Fadhel. The vizier, from hatred of Mamun, persuaded the caliph to appoint his son his successor, and deprive Motassem of his portion of territory. A war arose between the brothers. Mamun's general, Thaher, defeated the armies of the caliph, took Bagdad, and caused Amin to be put to death (813 A.D., Heg. 194).

Mamun was recognized as caliph. Nobler in his inclinations than Amin, he cherished the arts and sciences; but, like his brother, he left the government and armies to his ministers. His measures to secure the caliphate to the Alides in order to please Riza, his favorite, excited the powerful Abbassides to an insurrection. They declared Mamun to have forfeited the throne, and proclaimed Ibrahim caliph, but submitted again, after the death of Riza, when the caliph had changed his sentiments. The vast empire of the Arabs, embracing numberless provinces in two quarters of the globe, could hardly be held under his sceptre. There is but one step, and that an easy one, under a weak sovereign, from a viceroyalty to a kingdom. The wisdom of the former Abbassides could only retard this evil; the faults of the latter precipitated it. Even under Harun Al Raschid the Aglades had founded an independent empire in Tunis (800 A.D., Heg. 181), as had likewise the Edrisides in Fez. Thaher, having been appointed governor of Khorasan, made himself independent. From him the Thaherides derived their origin. Mamun sent Thomas, a Greek exile, with an army against the Greek emperor, Michael II. the Stammerer. Thomas depopulated Asia Minor, and laid siege to Constantinople; but a storm destroyed his fleet (823 A.D., Heg. 207). A second attack on the imperial city was repelled by the aid of the Bulgarians. Thomas was taken prisoner, and executed. Toward the many religious sects into which the Mussulmans were then divided Mamun acted with toleration. He died 833 A.D. (Heg. 218). During his government (about 830 A.D., Heg. 215), the African Arabs conquered Sicily and Sardinia, where they maintained themselves about 200 years, till the latter island was torn from them by the Pisans in 1016-17, and the former island by the Normans between 1061 and 1090.

Motassem, at first named Billah (by the grace of God), Harun's third son, built a new city, Samara, 56 miles from Bagdad, and transferred thither his residence. In his wars against the Greeks and rebellious Persians he first used Turkish soldiers. From grief at the death of his private physician, Motassem became insane, and died 842 A.D. (Heg. 227).

Vathek Billah, his son, member of the Motazelite sect, exerted himself to promote the advancement of science; but he was an enervated voluptuary, and died of nervous weakness (846 A.D., Heg. 232). A contest for the succession, between his brother Motawackel and his son Mothadi, was decided by the already powerful and arrogant Turkish bodyguard in favor of the former, the more unworthy competitor.

Under Motawackel it became more and more customary to carry on all wars by means of Turkish mercenaries. Thus the Arabs were rendered unwarlike and effeminate, as must necessarily be the case in a hot climate with those who do not live in constant activity. Motawackel manifested a blind hatred of the Alides, not sparing even the memory of the deceased. He moreover evinced a malignant spirit, and a proneness to sensuality and cruelty. His own son, Montasser, trained to early indulgence in both these vices, and often barbarously treated by him, conspired against him with the Turkish bodyguards, and effected his murder (861 A.D., Heg. 247).

The Turks, who now arrogated the right of electing the caliphs, called the murderer to the throne of the faithful, and compelled his brothers, who were innocent of the atrocious act, and whose revenge they feared, to renounce the succession which had been designed for them by Motawackel. Montasser died soon after of a fever, caused by the goadings of remorse (862 A.D., Heg. 248). The Turks then elected Mostain Billah, a grandson of the caliph Motassem. Two of the Alides became competitors with him for the caliphate. One of them, at Cufa, was defeated and put to death; but the other founded an independent empire in Tabristan, which subsisted half a century. The discord of the Turkish soldiers completed the dismemberment of the empire. One party raised to the throne Motaz, second son of Motawackel, and compelled Mostain to abdicate. Motaz Billah soon found means to get rid of him as well as of his own brother Muwiad. He then meditated the removal of the Turkish soldiers; but before he found courage to execute his projects they rebelled on account of their pay being in arrears, and forced him to resign the government. He soon after died (869 A.D., Heg. 255). They conferred the caliphate on Mohadi Billah, son of the caliph Vathek, but deposed this excellent prince 11 months after, because he attempted to improve their military discipline.

Under Motawackel's third son, the sensual Motamed Billah, whom they next called to the caliphate, Muaffek his brother succeeded, by his prudence and courage, in overcoming the dangerous preponderance of these Turks. Motamed transferred the seat of the caliphate from Samara back to Bagdad in the year 873 (Heg. 259), where it afterward continued. In the same year, owing to a revolution in the independent government of Khorasan, the dynasty of the Thaherides gave place to that of the Sofarides, who eventually extended their dominion over Tabristan and Segestan. The governor of Egypt and Syria, Achmet Ben Tulun, also made himself independent (877 A.D., Heg. 263), from whom are descended the Tulunides. The brave Muaffek annihilated, indeed, the empire of the Zinghians, in Cufa and Bassora, 10 years after its formation (881 A.D., Heg. 268); but he was unable to save the caliphate from the ruin to which it was continually hastening.

Motamed died soon after him (892 A.D., Heg. 279), and was succeeded by Muaffek's son, Mothadad Billah. He contended unsuccessfully with a new sect that had arisen in Irak—the Carmathians (899 A.D., Heg. 286)—against whom his son, Moktaphi Billah (902 A.D., Heg. 289), was more fortunate. He was still more successful in a war against the Tulunides, as he

again reduced Egypt and Syria in 905 (Heg. 292). Under his brother, Moktadar Billah, who succeeded him at the age of 13 years (909 A.D., Heg. 296), rebellions and bloody quarrels about the sovereignty disturbed the government of the empire. He was several times deposed and reinstated, and finally murdered (931 A.D., Heg. 319). During his reign Abu Mohammed Obeidallah rose in Africa, who, pretending to be descended from Fatima, daughter of the Prophet (therefore from Ali), overthrew the dynasty of the Agladides in Tunis, and founded that of the Fatimites (910 A.D., Heg. 298). Not satisfied with reigning independent of the caliph, this party, as descendants of the Prophet, asserted themselves to be the only lawful caliphs.

Shortly afterward the dynasty of the Bouides, in Persia, rose to authority and power (925 A.D., Heg. 315). Khorasan was still independent. The only change was that the Samanides had taken the place of the Soffarides. In a part of Arabia the heretic Carmathians ruled; in Mesopotamia, the Hamadamites. In Egypt, which had just been recovered, Akschid, from a governor, was called to be a sovereign. From him descended the Akschidites. Kaher Billah, Mothadad's third son, merited his fate, on account of his malice and cruelty. The Turkish soldiers having recovered their power drove him from the throne into exile (934 A.D., Heg. 322), in which he perished five years afterward. Rhadi Billah, his brother, bore the dignity of an emir al omra ("captain of the captains"), with which the exercise of absolute power, in the name of the caliph, was united; and thus the caliph was more and more thrown into the back-ground. The first who was invested with this dignity was Raik; but it was soon torn from him by the Turk Jakan, by force of arms, in the year 939 (Heg. 327). Jakan extended the power of the office to such a degree as to leave the caliph nothing, but the name of his temporal sway, and even assumed the right of determining the succession to the throne. Raik was indemnified by receiving Cufa, Bassora, and Irak Arabi as an independent government.

The next caliph, Motaki Billah, Moktader's son, made an effort to regain his independence by the murder of Jakun; but he was soon compelled by the Turkish soldiers to appoint Tozun, another of their countrymen, emir, who made this office hereditary. He formally devised it to a certain Schirzad, but it soon came into the possession of the Persian royal house of the Bouides, whose aid the succeeding caliph, Mostaki Billah, solicited against the tyranny of Schirzad. The first Bouide emir, Moezzeddulal, left it as an inheritance to his posterity. Not the caliph but the emir now reigned in Bagdad, though over only a small territory. In every remote province there were independent princes.

To continue the catalogue of the names of those who were henceforward caliphs would be superfluous, for these Mussulman popes had not by any means the power of the Christian. It would be too tedious to trace the branches into which the history of the caliphate is now divided; but we must briefly show the great changes which the different states and their dynasties have undergone, and which gave rise to the dominion of the Ottoman Porte.

During the minority of the Akschidite Ali, the Fatimite Morz Ledinillah, at that time caliph in Tunis, subjugated Egypt in 969 (Heg. 358),

and founded Cairo, which he made the seat of his caliphate. There were, consequently, at this time three caliphs,—at Bagdad, Cairo, and Cordova,—each of which declared the others heretics. But the Fatimites as well as the Abbassides fell under the power of their viziers, and, like them, the Omniades in Cordova were deprived of all power by the division of Spain into many small sovereignties, till they were entirely subverted by the Morabethun.

Ilkan, king of Turkestan, having conquered Khorasan, and overthrown the Samanides, was expelled again by Mahmud, prince of Gazna, who founded there the dominion of the Gaznevites, in 998 (Heg. 388), who were soon, however, overthrown in turn by the Seljuk Turks under Togrul Beg, in 1030 (Heg. 421). This leader conquered also Charasm, Georgia, and the Persian Irak. Called to the assistance of the Caliph Kajem Bemeillah, at Bagdad, against the tyranny of the Bouide emirs, he proceeded to Bagdad, and became emir himself in 1055 (Heg. 448), by which means the dominion of the Turks was firmly established over all the Mussulmans. To his nephew, Alp Arslan (who defeated and took prisoner the Greek emperor Romanus Diogenes), he left this dignity, with so great power that these Turkish emirs al omra were frequently called the sultans of Bagdad. Turkish princes, who aspired to be sovereigns in the other provinces, were at first satisfied with the title of atabek (father, teacher), such as the atabeks of Irak and Syria, of Azerbaijan, Farsistan (Persia), and Laristan. It was the atabeks of Syria and Irak with whom the Crusaders had principally to contend. The first was called Omadeddin Zenghi; by the Franks, Sanguin. They were afterward termed sultans. The Caliph of Bagdad was recognized by all as the spiritual sovereign of all Mussulmans: his temporal authority did not extend beyond the walls of Bagdad. Noureddin, Zenghi's son, being requested by the Fatimite caliph Adhed to protect Bagdad against his vizier, sent to Cairo, in succession, Shirkuh and Salaheddin or Saladin; but the latter overthrew the Fatimites (as schismatic anti-popes), and usurped the authority of Sultan of Egypt in 1170 (Heg. 556), with which he united Syria, after Noureddin's death. This is the great Salaheddin (Saladin), the formidable enemy of the Christians, the conqueror of Jerusalem. The dynasty which commenced with him was called, from his father, Ayoub, the Ayoubites. They reigned over Egypt till expelled by the Mamelukes in 1250. The Seljuk sultans of Irak were overthrown in 1194 (Heg. 590) by the Charasmians; and as those of Khorasan were extinct, there remained of the Seljuk dominions nothing but the empire of Iconium or Roum, in Asia Minor, from which the present Turkish empire derives its origin. See OTTOMAN EMPIRE.

The Charasmian sultans extended their conquests far into Asia, until their territories were invaded by the Tartars under Genghis Khan, in 1220 (Heg. 617). They were finally totally destroyed by his son Octai. Bagdad, also, the remains of the possessions of the caliphs, became the easy prey of a Mongol horde under Holagu, in 1258 (Heg. 636), by the treachery of the vizier Al Kami, and a slave, Amram, under the 56th caliph Motazem. The nephew of the cruelly murdered Motazem fled to Egypt, where he continued to be called caliph under the protection

of the Mamelukes, and bequeathed the Mohammedan popedom to his posterity. When the Turks conquered Egypt, in 1517, the last of these nominal caliphs was carried to Constantinople and died, after returning to Egypt in 1538. The Turkish sultans subsequently assumed the title of caliph, and have retained it to the present day, with the claim of spiritual supremacy over all Mussulmans, though this claim is little regarded out of his own dominions, and strongly disputed by the Persians.

Calip'pus, a Greek astronomer, who was the first to discover the inaccuracy of the golden number or period invented by Meton, and attempted to remedy it by the invention of a new cycle of 76 years, being only six hours less than the quadruple of Meton's period. It commenced 331 B.C., and being adopted particularly by astronomers in giving the date of their observations, is frequently mentioned by Ptolemy. Though more perfect than Meton's period, it was shown to be inaccurate by Hippocrates, who substituted for it a cycle of 345 years.

Calisa'ya Bark, the yellowish bark of *Cinchona Calisaya* (q.v.).

Calisthen'ics, or **Callisthenics**, the art of promoting gracefulness, strength, and health by means of the lighter forms of gymnastic exercise. See GYMNASTICS.

Cal'iver, an early form of hand-gun, musket, or arquebuse, lighter and shorter than the original musket, fired without a rest and much more rapidly. It seems to have gone out of fashion about 1630.

Calixtines, ka-lik's'tinz, or **Utraquists**, a sect of the Hussites in Bohemia, who differed from the Roman Catholics principally in giving the cup in the Lord's Supper to laymen, from which circumstance they got their name, derived from the Latin *calix*, "a cup." For their history see HUSSITES.

Calix'tus, the name of several popes. 1. The first was a Roman bishop from 217 to 224, when he suffered martyrdom. 2. **GUIDO**, son of Count William of Burgundy, archbishop of Vienne, and papal legate in France, was elected in 1119, in the monastery of Clugny, successor of the expelled Pope, Gelasius II., who had been driven from Italy by the Emperor Henry V., and had died in this monastery. In the same year he held councils at Toulouse and at Rheims, the latter of which was intended to settle the protracted dispute respecting the right of investiture. As the Emperor Henry V. would not confirm an agreement which he had already made on this subject, Calixtus repeated anew the excommunication which he had already pronounced against him when legate in 1112. He excommunicated also the anti-pope, Gregory VIII., and renewed former decrees respecting simony, lay investiture, and the marriage of priests. Successful in his contest with the emperor on the subject of investiture by means of his alliance with the rebels in Germany, in particular with the Saxons, he made his entrance into Italy in 1120, and with great pomp into Rome itself; took Gregory VIII. prisoner in 1121, and banished him to a monastery. He availed himself of the troubles of the emperor to force him, in 1122, to agree to the Concordat of Worms. After an energetic pontificate he died in 1124. 3. **CALIXTUS III.**, chosen in 1168

in Rome as anti-pope to Paschal III., and confirmed by the Emperor Frederick I. in 1178, was obliged to submit to Pope Alexander III. As he was not counted among the legal popes, a subsequent Pope was called Calixtus III. This was a Spanish nobleman, Alfonso Borgia, counselor of Alfonso, king of Aragon and the Sicilies. He was made Pope in 1455. He was at this time far advanced in life, but equaled in policy and energy the most enterprising rulers of the Church. He appointed an ecclesiastical commission to reconsider the case against Jeanne d'Arc, and its decision was that she died a martyr to her faith, her king, and her country. In order to appease the displeasure of the princes and nations occasioned by the proceedings of the councils of Constance and Basel, he instigated them to a crusade against the Turks. His intention was counteracted in Germany by the discontent of the states of the empire with the Concordat of Vienna, and in France by the appeals of the universities of Paris and Toulouse against the tithe for the Turkish war. King Alfonso, moreover, was indignant at the refusal of the Pope to acknowledge his natural son Ferdinand as king of Naples.

Calixtus (properly **CALLISEN**) **Georg**, gä'-örg, German clergyman, the most able and enlightened theologian of the Lutheran Church in the 17th century: b. Medelbye, Schleswig, 14 Dec. 1586; d. 19 March 1656. In 1609 he visited the universities of the south of Germany; in 1612 those of Holland, Britain, and France, where his intercourse with the different religious parties and the greatest scholars of his time developed that independence and liberality of opinion for which he was distinguished. In 1614 he was made professor of theology at Helmstedt, and he held this post till his death. His treatises on the authority of the Holy Scriptures, transubstantiation, celibacy, supremacy of the Pope, and the Lord's Supper belong, even according to the judgment of learned Roman Catholics, to the most profound and acute writings against Roman Catholicism. But his genius and the depths of his exegetic and historical knowledge exposed him to the persecutions of the zealots of his time. His assertion that the points of difference between Calvinists and Lutherans were of less importance than the doctrines in which they were agreed, and that the doctrine of the Trinity was less distinctly expressed in the Old Testament than in the New, and his recommendation of good works, drew upon him the reproach of heresy. He made Christian morality a distinct branch of science, and, by reviving the study of the Christian fathers and of the history of the Church, prepared the way for Spener, Thomasius, and Semler.

Calking, kôk'ing, the process of driving tarred oakum into the seams between the planks of ships, in order to render the joints watertight. A wisp of the oakum is drawn out and rolled together between the hands, and, being laid over the seam, is driven by a wedge-shaped instrument called a calking iron. The work is afterward gone over with a more powerful instrument of the same kind, which is held by one man and struck with a beetle held by another. When all the oakum is forced in that is practicable, the seams are payed over with melted pitch, and where they are to be covered

CALKINS — CALLED BACK

with copper, a thread of spun yarn is laid in to make them flush with the planks.

Calkins, kô-kîns, Franklin Welles, American writer: b. Iowa County, Wisconsin, 5 June 1855. He has traveled extensively in the Rocky Mountains, 1870-86; and is the author of 'Frontier Sketches' (1893); 'Indian Tales' (1893); 'Hunting Stores' (1893); 'The Congar Tamer' (1899).

Calkins, Gary Nathan, American scientist: b. Valparaiso, Ind., 18 Jan. 1869. He was graduated at the Massachusetts Institute of Technology in 1890; had charge of scientific expeditions to Alaska in 1896 and 1897; and in 1900 was instructor in Zoology at Columbia University.

Call, Wilkinson, American senator: b. Russellville, Ky., 9 Jan. 1834. He went to Florida as a boy, adopted the legal profession; served as adjutant-general in the Confederate army, and was presidential elector for the State-at-large in 1872 and 1876, and the same year was a delegate to the Democratic National Convention. He was chosen senator by the Florida legislature under the provisional government established by President Johnson, but was denied admission. In 1879 he was elected senator and took his seat on 18 March. He was re-elected in 1885 and 1891, serving until 3 March 1897.

Cal'la, a genus of plants of the natural order *Araceæ*, consisting of herbaceous marsh plants with creeping or floating stems, cordate leaves, and spadices of small flowers enveloped in large leafy spathes. The flowers are succeeded by red berries. *C. palustris* occurs in cold bogs, from New Jersey to Nova Scotia, and west to Michigan in America, and in the north of Europe. It has a creeping root-stock extremely acrid in taste, but which, when deprived of its acridity by maceration and boiling, is made by the Laplanders into a kind of bread. The Trumpet Lily, or Lily of the Nile (*Richardia athiopica*), is sometimes referred to this genus.

Cal'lahan, James Morton, American publicist: b. Bedford, Ind., 4 Nov. 1864. He was graduated at the University of Indiana in 1894, and became lecturer on American diplomatic history at Johns Hopkins University in 1898. He has written 'Neutrality of the American Lakes' (1898); 'Cuba and International Relations' (1899); 'American Relations in the Pacific and the Far East' (1901); 'Confederate Diplomacy' (1901); 'The American Expansion Policy.'

Callao, kâl yâ'ô or kâl lâ'ô, Peru, the port of Lima, and the starting point of the Callao, L. & Oroya R.R. It is situated in lat. 12° 4' S., lon. 77° 8' W. The railway connects the seaboard with a point near the head of navigation on the Amazon River, and the line of the inter-continental railway, according to surveys tentatively approved in 1902, will pass through Oroya. Thus Callao, as a crossroads port, is favorably situated for sharing in the future commercial development of South America, though it has not a very good harbor. After the defeat of the combined forces of Peru and Bolivia by Chile in 1880, Callao was bombarded by a Chilean fleet. (See CHILE.) In 1867 it had a similar experience at the hands of Spain. For early history see PERU. On 28 Oct. 1746, a

great wave destroyed the town, the frigate San Firmin was carried far inland, 19 vessels were stranded, and 4,600 people killed (see LIMA). The famous castle of Callao, planned by the French mathematician Godin, was completed by the viceroy Manuel de Amat. Callao Castle was the last point on the Pacific coast to be surrendered by the Spaniards. Pop. about 50,000.

Callaway, Morgan, American educator: b. Cuthbert, Ga., 3 Nov. 1862. He was educated at Emory College, Ga., and at Johns Hopkins University, and has been professor of English in the University of Texas from 1890. He has published 'The Absolute Principle in Anglo-Saxon' (1889); 'The Appositive Principle in Anglo-Saxon' (1901).

Callaway, Samuel Roger, American railroad president: b. Toronto, Canada, 24 Dec. 1850. At the age of 14 he entered the employ of the Grand T. Ry, and later was in the service of the Canadian Express Company, and Great W. Ry. His rapid progress thereafter may be summarized as follows: in 1875 he became superintendent of the Detroit & M. R.R.; in 1880, manager of the Chicago & G. T.; in 1884, vice-president of the Union P. and allied lines of nearly 6,000 miles; president of the Toledo, St. L. & K. C. R.R.; 1887-95, president of the Lake Shore & M. S., 1897-8; president of the New York C. & H. R. R.R., 1898-1901. He has long been regarded as one of the ablest railway managers in the United States. Since 1901 he has been president of the American Locomotive Company.

Callcott, kôl'kôt, Sir Augustus Wall, English painter: b. Kensington, 20 Feb. 1779; d. there, 25 Nov. 1844. He studied portrait-painting under Hoppner, but soon discovered that his genius lay in another department of art, and was so successful in his delineation of landscape, that in 1807 he was elected an associate of the Royal Academy. In 1837 he was knighted, and in 1843 was appointed keeper of the royal collections of pictures. He suffered much from ill health for many years before his death. Callcott excelled in the delineation of coast scenes, and like Turner, has been called the "Modern Claude."

Callcott, John Wall, English composer, brother of Augustus Wall (q.v.): b. Kensington, 20 Nov. 1766; d. near Bristol, 15 May 1821. He at first intended to become a surgeon, but abandoned the intention, and devoted himself to music. In 1785 he competed for the prizes of the Catch Club, and gained three out of four gold medals. In the following decade the same club awarded him 20 medals. In 1790, when Haydn arrived in England, he studied under him, and the same year obtained from Oxford the degree of musical doctor. In 1805 he published his 'Musical Grammar'; and in 1806 was preparing to deliver lectures on music at the Royal Institution when his mind gave way. He never completely recovered, although his insanity left him on one occasion for three years. He ranks among the most eminent of English composers.

Called Back, a sensational tale by "Hugh Conway" (FREDERICK JOHN FARGUS), published in 1883. Extremely sensational in character, and with little literary merit, the graphic force of this story, the rapidity of its movement, its di-

CALLEJA DEL REY—CALLIMACHUS

rectness, and its skilful suspension of interest, gave it for a season so extraordinary a vogue that it outsold every other work of fiction of its year.

Calleja del Rey, käl-yā'hä dël rä, **Felix Maria**, Spanish general: b. Medina del Campo, 1750; d. Cadiz, 1820. He distinguished himself in Mexico by quelling the insurrection instigated in 1810 by Hidalgo, who was on the point of seizing the city of Mexico, when Calleja was charged by the viceroy Venegas to oppose his progress. After encounters, in which both parties strove to surpass each other in a display of cruelty and brutality, Calleja succeeded in defeating Hidalgo's army, and on 2 Jan. 1812, he took possession of the principal fortress Zitaquaro, and massacred the inhabitants. Hidalgo, who fell near Guadalajara, was succeeded by the priest, Morelos, who defended Cuautla Amilpas against the attack of Calleja with great bravery until 2 May 1812, when famine forced him to surrender. Calleja again signalized his victory by acts of barbarism, and was rewarded for his zeal, 4 March 1813, by the appointment of viceroy, in which capacity he continued to alienate the feelings of the Mexicans by his relentless rigor. The priest, Morelos, fell into his hands and was shot, 22 Dec. 1815. Subsequently he promulgated an amnesty, but as he was unable to restore peace to the distracted country, he was recalled. On his return to Spain he was created Conde de Calderon, and in January 1820, while preparing to sail from Cadiz against the revolutionists of Paraguay, his troops having mutinied, he was captured and remained prisoner in the fortress of the Isla de Leon until the insurrection was quelled by Ferdinand VII., when he died, soon after having recovered his liberty.

Cal'lender, James Thomas, American publicist: b. England; d. 1803. He was exiled for his pamphlet 'The Political Progress of Great Britain.' He wrote: 'Sketches of the History of America'; 'The Prospect Before Us.'

Callender, John, American historian: b. Boston, Mass., 1706; d. Newport, R. I., 26 Jan. 1748. He collected many valuable papers relating to the Baptists in America; and published 'A Centennial Discourse on the Civil and Religious Affairs of the Colony of Rhode Island' (1739), which was the only history of that State for more than a century. The State Historical Society reprinted it, with notes by Rev. Romeo Elton (1838), and a memoir of the author.

Cal'lernish, Scotland, a village and district in the island of Lewis, on Loch Roag, 16 miles west of Stornoway, famous for its circles of standing-stones. The main circle is 40 feet in diameter, formed of 12 unhewn blocks of gneiss from 10 to 13 feet high, with a larger block in the centre. From this circle rows of stones project to the east, west, and south. There are upward of 40 blocks altogether.

Callet, Antoine François, än twän frän swä kä-lö, French historical painter: b. Paris, 1741; d. 1823. He obtained his earliest prize in 1764 for a painting entitled 'Biton and Cleobis' and became a member of the Academy in 1780. He painted portraits of Louis XVI., Louis XVIII. and the Comte d'Artois, and several other works now in the Louvre.

Callet, Jean François, zhöñ frän-swä, French mathematician: b. Versailles, 1744; d. 1798. He completed his studies at Paris in 1768, and in 1779 gained the prize which the Academy of Arts at Geneva had proposed for escapements in watches. In 1788 he was appointed professor of hydrography at Vannes, and shortly after obtained the same appointment at Dunkirk. He was afterward professor of the geographical engineers at the Dépôt de la Guerre, Paris. He is best known by his 'Tables of Logarithms.'

Calilchthys, käl-ik'thís, a genus of fishes belonging to the abdominal malacopterygians, and family *Siluridæ* or sheat-fishes. They are natives of hot climates, and are said to make their way over land in search of water during dry seasons.

Callic'rates, Greek architect of the 5th century B.C. He was a contemporary of Ictinus and with him erected the Parthenon at Athens.

Callicrat'idas, a Spartan, succeeded Lysander in the command of the Lacedæmonian fleet against the Athenians, in 406 B.C. He defeated Conon at Mitylene, and was afterward himself defeated by the Athenians at Arginusæ, where he was drowned.

Calligo'num, a genus of shrubs belonging to the *Polygonacæ*. They are leafless plants, with small flowers, branches jointed, dichotomous, and the fruit a large, four-cornered nut. The root of *C. Pallasia*, a leafless shrub found in the sandy steppes of Siberia, furnishes from its roots, when pounded and boiled, a gummy, nutritious substance like tragacanth, on which the Calmucks feed in times of scarcity, at the same time chewing the acid branches and fruit to allay their thirst.

Callimachus, Greek poet and grammarian: b. Cyrene, about 310 B.C.; d. about 240. He opened in Alexandria a school of grammar, that is, of the belles-lettres and liberal sciences, and could boast of several scholars of distinguished attainments, such as Eratosthenes, Apollonius Rhodius, Aristophanes of Byzantium, and others. Ptolemy Philadelphus presented him with a place in the museum, and gave him a salary, as he did other men of learning. After the death of Philadelphus, he stood in equal favor with Ptolemy Euergetes. Under these circumstances he wrote most of his works, the number of which was very considerable. With the exception of some fragments, we have of these only 64 epigrams and 6 hymns. His poem on the hair of Berenice has been preserved in the Latin adaptation of Catullus ('De coma Berenices'). Callimachus' poems bear the stamp of their age, which sought to supply the want of natural genius by a great ostentation of learning. Instead of noble simple grandeur, they exhibit an overcharged style, a false pathos, and a straining after the singular, the antiquated, the learned. His elegies are mentioned by the ancients with great praise, and served Propertius as models. The best edition of the hymns and epigrams is that of Meineke (Berlin 1861).

Callim'achus, Greek artist, supposed to have lived about the end of the 5th century. His work is celebrated by some of the ancient writers, and he is said to have been the inventor of the Corinthian capital.

Callinger, käl-lin-jär', or **Kalinjar**, India, a hill fort in the northwest provinces, division of Allahabad, and district of Banda, 90 miles southwest of the town of Allahabad. The summit of the hill on which it stands is about 1,200 feet above the plains below. At the southeastern base of the hill is a decaying village, which was formerly a place of considerable importance and the capital of a rajahship. The whole summit of the hill, comprehending a plain five miles in circuit, is encompassed by an immense rampart of Mohammedan construction. It was surrendered to the British in 1812. There are a number of interesting caves, tombs, temples, and statues here.

Callinus of Ephesus, the earliest Greek elegiac poet, flourished probably about 700 B.C. Only a few fragments of his elegies are extant; these have been edited by several scholars, among them Bergk, in the 'Poetæ Lyrici Græci.'

Callionymus, a genus of fishes (the drag-onets) belonging to the family *Gobudæ*. They are distinguished by having the eyes very near together, teeth on the jawbone but none on the roof of the mouth, six gill-rays, and the first dorsal fin long, usually much elevated and, in many species, brightly colored.

Calliope, käl li'ō pē. 1. In Greek mythology, one of the Muses (q.v.). She presided over eloquence and epic poetry. She is said to have been the mother of Orpheus by Apollo. She was represented with an epic poem in one hand and a trumpet in the other, and generally crowned with laurel.

2. An asteroid (No. 22). It was discovered by Hind, on 16 Nov. 1852.

3. A musical instrument, consisting of a series of steam whistles, pitched to produce the notes of the scale, and grouped together and operated by a keyboard.

Calliope Humming-bird. See HUMMING-BIRD.

Callipers. See CALLIPER COMPASSES.

Callisen, Henry, Danish physician and surgeon: b. Pentz, Holstein, 1740; d. Copenhagen, 5 Feb. 1824. He educated himself by his own exertions, and was made, in 1771, chief surgeon in the Danish fleet, and in 1773 professor of surgery at the University of Copenhagen. He wrote in 1777 his 'Institut. Chirurgiæ Hodiernæ,' which was received with applause by all Europe.

Callisthenes, Greek historian: b. Olynthus, about 365 B.C.; d. 328. He was a nephew and pupil of Aristotle, and was appointed to attend Alexander the Great in his expedition against Persia. His republican sentiments rendered him unfit for a courtier, but his unpardonable crime was his opposition to the assumption of divine honors by the conqueror. On a charge of treason, he was put to death, by what method historians are not agreed. Of several historical works written by him only fragments remain.

Callisthenics. See GYMNASTICS.

Callisto, in Greek mythology, a nymph of Artemis, daughter of Lycaon, king of Arcadia. According to the most prevalent story of this maiden, Zeus loved her, and her son Arcas was hid in the woods, and preserved, while she was changed by the jealousy of Hera into a

bear. Zeus placed her, with her son, among the stars, as the constellation of the Great Bear.

Callistratus, käl-lis'tra-tūs, Athenian orator: b. about 400 B.C.; d. 361. His eloquence is said to have fired the imagination of the youthful Demosthenes. For his Spartan sympathies he was condemned to death by the Athenians, and on his return from exile in Macedonia was actually executed.

Callot, Jacques, French engraver: b. Nancy, 1592; d. there 1635. He overcame many obstacles to his study of art, twice running away from his parents. He went to Italy, learned drawing in Rome, soon gave himself up entirely to his love for engraving, and became famous for his etchings. In the space of 20 years he designed and executed about 1,600 pieces, most of them, except sacred subjects, representations of battles, sieges, dances, festive processions, etc. The 'Misères et Malheurs de la Guerre,' in 18 pieces, may be mentioned as a remarkable series. He executed works of this kind for Cosmo II. of Florence, Louis XIII. of France, and the Duke of Lorraine. His 'Fair' and his 'Beggars' are called his best pieces. He was the first who used in his etchings the hard varnish—the *vernice grosso dei lignaiuoli* of the Italians. He was distinguished for his piety, magnanimity, and regularity of life.

Callow, William, English water color artist: b. Greenwich, 28 July 1812. He studied in Paris and was for seven years professor of water color painting to the family of Louis Philippe. He has received many medals and is the senior member of the Royal Society of Painters in Water Colors. He still continues to exhibit and is the author of 'Illustrated Book of Versailles'; 'Work Illustrative of Deep Sea Fishing,' etc.

Calluna. See HEATH.

Callus, an abnormal hard growth, either carneous or osseous. The new growth of bony substance between the extremities of fractured bones, by which they are united, is an instance of the latter. External friction or pressure produces the former, as in the hands of laborers and the feet of persons who wear ill-fitting shoes. See CORN.

Calmar, käl'mär. See KALMAR.

Calmet, Augustin, ô-güst-än käl-mä, French exegetical and historical author: b. Mesnil-la-Horgne, near Toul, France, 26 Feb. 1672; d. Paris, 25 Oct. 1757. He entered the order of St. Benedict in 1688, and became the head of several abbeys in succession. In 1698 he became teacher of philosophy and theology in the abbey of Moyen-Moutier. He was an industrious compiler of voluminous works. Among them are: 'Commentary on the Old and New Testaments' (Paris 1707-16); 'Historical and Critical Dictionary of the Bible'; and 'Ecclesiastical and Civil History of Lorraine.'

Calmon, Marc Antoine, märk än-twän käl-môn, French political economist: b. Tarnies, Dordogne, 3 March 1815; d. Paris, 13 Oct. 1890. He entered the National Assembly as life member in 1875, but will be longest remembered for his writings on political economy, which include 'Les impôts avant 1789' (1865); 'William Pitt, étude financière et parlementaire'

CALMON DU PIN E ALMEIDA — CALOPHYLLUM

(1865); 'Histoire parlementaire des finances de la Restauration' (1868-70); 'Etude des finances de l'Angleterre depuis la réforme de Robert Peel, jusqu'en 1869' (1870).

Calmon du Pin e Almeida, Miguel, Brazilian statesman: b. Santa Amara, Bahia, 22 Dec. 1796; d. Rio de Janeiro, 5 Oct. 1865. He entered the Constituent Assembly in 1822, was senator in 1840, prime minister in 1840 and again in 1843 and resided in Europe as special envoy 1844-7. He was created viscount in 1849 and Marquis of Abrantes in 1854.

Calms, Region of, tracts in the Atlantic and Pacific oceans, on the confines of the trade-winds, where calms of long duration prevail. This region is not the same all the year through, but follows the course of the sun, and lies farther north or farther south according to the hemisphere in which the sun happens to be. About the winter solstice its average northern limit is in lat. 5° N., and in the months about the summer solstice its average northern limit is about 12° N. lat. The southern limit lies nearly always to the north of the equator, varying between lat. 1° and 3° N.; but it is sometimes, though rarely, so far south as lat. 1° or 2° S. During the months following the winter solstice its average breadth is four degrees, while in the months following the summer solstice it is about six degrees. The calms prevail especially on the northern margin of this region, but even there there is an occasional light breeze, but not sufficient to fill the sails. The climate of this region is extremely unpleasant, for the atmosphere is moist and foggy, and the sky generally overcast and gloomy. Almost every day there occurs a violent storm of thunder and lightning, accompanied by sudden blasts of wind, and by rain which falls in regular streams for hours together. On this account the region is dangerous to navigators. To increase these dangers there is between lat. 4° and 10° N., and lon. 18° and 23° W., a tract of considerable extent, which seamen call the "rainy sea," and which, with only rare intervals of calm, is visited by almost constant storms of thunder and lightning, and violent falls of rain, from which it is very difficult for a sailing vessel to make its escape.

Cal'mucks. See KALMUCKS.

Calomarde, or Calomarda, Francisco Tadeo, frân-thês'kô tâ-dâ'ô kâ-lô-mâr'da (COUNT OF ALMEIDA), Spanish statesman: b. Villel, Aragon, 1775; d. Toulouse, France, 1842. He studied law, entered political life and sustained the national cause in resistance to Napoleon. In 1814 on the return of Ferdinand VII., Calomarde was made chief secretary of the department of Indian affairs. Here he was convicted of bribery and banished to Toledo and afterward to Pamplona. In 1823 he received the appointment of secretary to the regency, and subsequently an important office in the royal household, and he was appointed minister of justice. He organized the corps of royalist volunteers, recalled the Jesuits, reopened the convents, and closed the universities. In 1832, when Ferdinand's death was supposed to have taken place, Calomarde was the first to bend his knee before Don Carlos. The king recovered physically, but lingered in a semi-idiotic condition: of this Calomarde took advantage, by extorting from him his signature to the act

of 31 Dec. 1832, in which Ferdinand abdicated in favor of Don Carlos. When Ferdinand revealed this fraudulent proceeding, Calomarde was banished to Aragon, and later avoided imprisonment by escaping to France in disguise. Here he passed the rest of his days in obscurity.

Cal'omel, the sub-chloride, or "mild" chloride of mercury, HgCl (or Hg₂Cl₂); known to chemists as "mercurous chloride," to distinguish it from corrosive sublimate, HgCl₂, which is known as "mercuric chloride." (For its preparation see MERCURY.) In the use of calomel as a medicine, particular attention should be given to its liability to generate corrosive sublimate by decomposition. This effect may be produced by bitter almonds or cherry-laurel water, or any other substance containing hydrocyanic acid, being administered simultaneously with it. Nitro-muriatic acid produces the same effects, as also, to some degree, the chlorides of potassium, sodium, and ammonium. It is rendered ineffectual by the alkalis and alkaline earths. Calomel is regarded as the most valuable of the mercurial preparations, though some medical innovators reject it. It is employed as a purgative, operating chiefly upon the liver by stimulating its secretory functions. Being slow in its action, and liable to salivate if too long retained, it is usually administered with some saline cathartic. It is also given as a remedy for worms, and as an alterative in derangement of the liver.

Calomel occurs native in Spain, Bohemia, Servia, Mexico, and elsewhere, in the form of tetragonal crystals white in color (or nearly so) with a hardness of from 1 to 2, and a specific gravity of 6.48.

Calonne, Charles Alexandre de, shârl a-lêks-andr de ka-lôn, French statesman: b. Douai, 20 Jan. 1734; d. Paris, 30 Oct. 1802. He succeeded Necker in 1783 as comptroller-general of the finances, and found not a single crown in the treasury. In this office he continued till 1787. During this period he maintained the public credit by a punctuality till then unknown in the payments of the royal treasury, though he found it drained to the lowest ebb. He labored with unwearied assiduity to restore the equipoise between the annual income and expenditure, and to provide a supply for the emergencies of the state, without increasing the burdens of the people. For this purpose he advised the king to revive the ancient usage of convening the national assemblies of the "notables," to whom he proposed the bold project of suppressing the pecuniary privileges and exemptions of the nobility, clergy, and magistracy. This measure alarmed those powerful bodies, and Calonne found it necessary to retire to England, where he wrote two defenses of himself—his 'Petition to the King,' and 'Reply to Necker.' On the breaking out of the Revolution he supported the Royalist party with much zeal, both by his pen and his journeys to various countries of Europe on their account.

Calophyllum, a genus of trees belonging to the natural order *Guttifera*, and natives of warm climates. They have large shining leaves, with numerous transverse parallel veins. Some of the species yield excellent timber. *C. mophyllum* affords a medical resin, the tacamahac of the East Indies. The seeds yield an oil which is

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used for burning, for making ointment, etc. *C. calaba* is a West Indian species whose oil is used for illuminating purposes.

Calores'cence, the phenomenon of the transmutation of heat rays into light rays; a peculiar transmutation of the invisible calorific rays, observable beyond the red rays of the spectrum of solar and electric light, into visible luminous rays, by passing them through a solution of iodine in bisulphide of carbon, which intercepts the luminous rays and transmits the calorific. The latter, when brought to a focus, produce a heat strong enough to ignite combustible substances, and to heat up metals to incandescence; the less refrangible calorific rays being converted into rays of higher refrangibility, whereby they become luminous.

Calor'ic (Latin, *calor*, "heat"), a name formerly given to a hypothetical, imponderable fluid, whose existence was postulated in order to explain the observed phenomena of heat. It is known that no such fluid exists, and the word is now practically obsolete, except as an adjective in such expressions as "caloric effect," "caloric engine," etc., where it stands for the words "thermal," or "heat," though sometimes in a special sense. (For a statement of the principles of the old caloric theory, consult Preston, 'Theory of Heat,' p. 34.) See also HEAT; THERMODYNAMICS.

Caloric Engine, a name originally given by Ericsson to a form of hot-air engine invented by him, in order to distinguish it from other engines whose operation depends upon the same general principles; but now commonly applied to every form of hot-air engine in which the source of the motive power is a furnace external to the working cylinder, but associated with it. In these engines air is admitted to the working cylinder, where it is heated by contact with the hot cylinder wall. Its pressure at once rises, and it is then allowed to expand, pushing a piston before it. A new supply of air is next admitted, and the process is repeated indefinitely. Hot-air engines are useful for pumping and other small work, especially because they do not need a skilled engineer. They have also been thoroughly tried upon a large scale, but without lasting success. Doubtless the inventors who have striven to overcome the immense practical difficulties that appear to be inherent in the hot-air engine have been stimulated by the knowledge that in the steam-engine an enormous quantity of heat is required merely to evaporate the water that is used, before a single pound of pressure can be exerted upon the piston of the engine. The heat so expended appears to be largely wasted, and hence it might be hoped that some form of air-engine can be devised that will avoid this apparent source of loss, and be correspondingly more efficient. (See THERMODYNAMICS.) It does not appear that this hope is likely to be fulfilled by the hot-air engine; and the gas-engine (q.v.) must be regarded as a far more promising subject for the exercise of inventive genius, and a far more formidable rival of the steam-engine. (For more detailed accounts of the hot-air engines now in use, consult Hutton, 'Heat and Heat Engines,' and Carpenter, 'Text-Book of Experimental Engineering.') The latter volume contains useful directions for testing such engines. For the general theory of the hot-air engine, see

Wood, 'Thermodynamics,' and Rankine, 'The Steam-Engine and Other Prime Movers.'

Cal'orie, or **Cal'ory**, the unit of heat; the amount of heat necessary to raise the temperature of a kilogram of water one degree Centigrade, or from 0° to 1° C. It is used as a standard of heat by physicists as the term "foot-pound" is employed as the unit of energy. It is also known as the "greater calorie," to distinguish it from the "small calorie," in which the unit of mass is the gram instead of the kilogram. See CALORIMETRY.

Calorimeter, Respiration. The respiration calorimeter is an instrument which has proved of great value for studying the fundamental laws of nutrition, as well as more practical problems. It takes its name from the fact that it is used to measure and study the products of respiration and to measure energy in the form of heat. The apparatus was devised (1896-1903) by Professors W. O. Atwater and E. B. Rosa, under the auspices of the United States Department of Agriculture, co-operating with the Storrs (Connecticut) Experiment Station and the Wesleyan University, some of the features being suggested by the respiration apparatus elaborated a number of years ago by Pettenkofer of Munich.

The apparatus includes a copper walled chamber about seven feet long, four feet wide, and six and one-half feet high, in which the man who served as subject of the experiment lives one or more days and nights, usually at least four. An opening in the front of the apparatus, sealed during an experiment, serves as both door and window. A smaller opening in the side, called the food aperture, having tightly-fitting caps on both ends, is used for passing food, drink, excreta, and other materials into and out of the chamber. There is a telephone by which the subject may communicate with those outside. The chamber is furnished with a folding chair, table and bed. Air is kept in circulation through the chamber at the rate of not far from two and one-half cubic feet a minute. Thus, while the dimensions of the chamber are rather small, the subject finds nothing particularly disagreeable or uncomfortable in his sojourn within it, save for the restricted space and the monotony of the prescribed daily routine.

The circulation of air is effected by a special pump, which measures the volume of the ventilating current and at regular intervals draws measured samples of the outgoing air for analysis. At the same time samples of the incoming air are also taken for analysis. From these determinations the amounts of respiratory products—carbon dioxide and water—given off by the subject may be computed.

The diet during an experiment is uniform from day to day. All food and drink, and all solid and liquid excreta are carefully weighed, sampled and analyzed. By comparing the chemical elements and compounds received by the body in food, drink and inhaled air with those given off in the solid, liquid and gaseous excretions, it is possible to strike a balance between the total income and total outgo of matter in the body and to determine whether it has increased or diminished its store of material. In this way a gain or loss of even a small

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fraction of an ounce of body fat or protein during a period of one or several days can be detected and measured.

At the same time it is desirable to study the metabolism of energy. This is done likewise by determining the balance of income and outgo. The measurements made in these investigations are in terms of heat, since other forms of energy may be transformed into it. To this end it is necessary to know how much energy is taken into the body in food and drink, how much is given off unused in the solid and liquid excreta, and how much is transformed in the body and given off in the forms of heat and external muscular work.

burned outside the body, that is by their heats of combustion, as learned by burning samples of them with oxygen in an apparatus called the bomb calorimeter.

As regards the outgo of energy it must be remembered that heat is constantly given off within the chamber of the man's body, whether he is at work or at rest. When he is at rest, *i. e.*, doing no external muscular work, there is nevertheless a great deal of muscular work going on within his body. Even when he is asleep the organs of respiration, circulation and digestion are active. The energy of the internal work is transformed into heat in the body and leaves the body as heat. In rest ex-

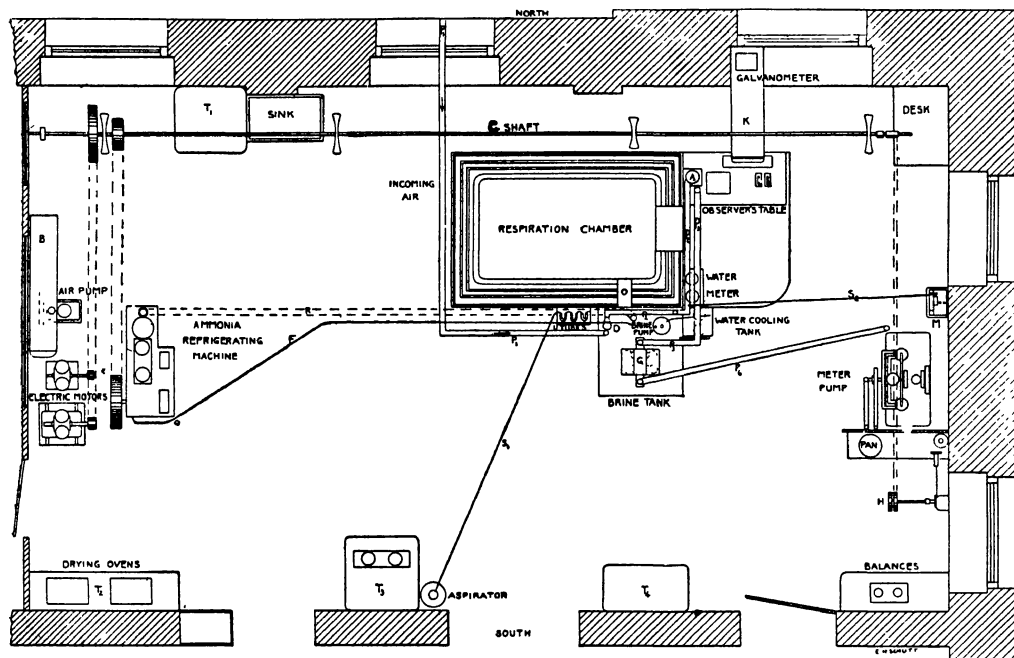


FIG. A. GROUND PLAN OF RESPIRATION CALORIMETER LABORATORY.

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| <p>A. Device for regulating temperature of ingoing air current.</p> <p>B. Tank for compressed air used to drive valves of meter pump and operate brine pump of freezing apparatus.</p> <p>C. Shaft for driving meter pump and other mechanism.</p> <p>F. Feed pump bringing ammonia to freezing apparatus.</p> <p>R. Return pipe conveying ammonia from freezing apparatus.</p> <p>O. Food aperture.</p> <p>P1. Pipe bringing air to freezing tank.</p> <p>P2. Pipe conveying air from freezing tank to respiration chamber.</p> <p>D. Freezer used to remove moisture from ingoing air.</p> | <p>P3. Pipe conveying air from respiration chamber to freezer.</p> <p>P4. Pipe conveying air from freezer to meter pump.</p> <p>G. Freezer used to remove moisture from outgoing air.</p> <p>S1. Pipe conveying air for analysis from chamber to aspirator.</p> <p>S2. Pipe conveying sample of ingoing air for analysis to meter.</p> <p>M. Small meter used to measure samples of ingoing air.</p> <p>H. Secondary shaft connecting main power shaft with meter pump.</p> <p>K. Box where galvanometer is read.</p> <p>T1, T2, T3, and T4. Balances, drying oven, sink, and tables used for analytical operations.</p> |
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So far as we know the only energy received by the body is the potential energy of the food, and the only forms in which it leaves the body are (1) partly in the potential energy of the unoxidized residues of food and body material which are eliminated in the solid and liquid excreta, but (2) chiefly in the kinetic energy resulting from the oxidation of material in the body, and leaving the body, so far as is known, only as heat and external muscular work.

The potential energy of the food and excretory products is measured by the amount of heat generated when these substances are

periments, practically all the kinetic energy leaves the body as heat. In work experiments part is put forth as muscular power applied to the pedals of a bicycle-dynamo, which transforms this external muscular energy into heat and as an ergometer, measures its amount. The problem is to measure the whole heat including that which left the body as heat and that which resulted from the transformation of the muscular work. The method consists in collecting this heat, for measurement, and at the same time providing that there shall be no gain or loss in the amount.

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The chamber of the calorimeter is enclosed by double metal walls, which are surrounded on all sides by walls of wood with air spaces between, so that the temperature within the chamber is not greatly affected by changes in the temperature of the room outside. Very delicate thermo-electric elements arranged in series and connected with a galvanometer, show changes in the temperature of the metal walls; and devices for heating and cooling the walls are arranged so that their temperature may be kept as near that of the interior of the chamber as desired and the very small amounts of heat that may pass through them into or out of the calorimeter may be made to counterbalance each other. The temperature of the ventilating air current is also regulated so that neither more nor less heat is taken in than is brought out. Accordingly there is no gain or loss of heat either through the walls of the chamber or by the ventilating air current.

The heat produced within the chamber is that from the energy of the material oxidized in the man's body. The only way this heat can escape is by the proper agencies for carrying it out and measuring it, two in number. A small portion of the heat generated within the chamber is carried out by water vapor in the ventilating air current. The excess of vapor in the air leaving the chamber over that in the air entering it represents the amount given off as vapor from the body of the subject, and has required heat to vaporize it. The amount of this heat is computed by factor from the amount of water vapor and the temperature at which it leaves the chamber.

The larger part of the heat generated within the chamber is absorbed and carried out of it by a current of cold water, flowing through a copper pipe around the interior. The cooling surface of the pipe is increased by thin disks of copper fastened at close intervals along the coil. The water enters the chamber at a low temperature, passes through the copper coil, absorbs heat from the chamber and passes out at a higher temperature. The quantity of water and the difference between the temperatures at which it enters and leaves the coil are carefully determined and show how much heat was thus brought out of the chamber. Adding the heat brought out by the water vapor in the ventilating air current to this heat we have the whole heat produced.

By regulating the temperature and rate of flow of the water current, the heat is absorbed and carried out of the chamber as fast as generated, at the same time keeping the temperature within the chamber at a point agreeable to the subject and almost absolutely constant. So delicate are the measurements of temperature of the air within the chamber, and of the metal walls, that the observer sitting outside the apparatus and noting the changes every two or four minutes, immediately detects a rise or fall of even one one-hundredth of a degree. The accuracy of the respiration calorimeter is shown by the fact that in check experiments in which large quantities of alcohol were burned in a lamp in the chamber 99.8 per cent of the theoretical amount of carbon-dioxide, 100.1 per cent of the theoretical water, and 99.9 per cent of the energy were measured. In the average of 32 experiments with man, covering 107 days,

the energy measured was 99.9 per cent of the theoretical amount, and the value for carbon and hydrogen was equally satisfactory. Fig. A. shows the general plan of the apparatus and accessories.

The data for the metabolism of matter and of energy, obtained as heretofore explained, taken in connection with what is known of the physiological processes that go on in the body, give more accurate information than can be otherwise obtained regarding the ways in which food is used in the body, the quantities of different food ingredients that are needed to supply the demands of the body, the different conditions of rest and work, and the comparative nutritive value of different food materials. A respiration calorimeter, like that described, has been built, under government auspices, at Bonn, Germany, and a form adapted for experiments with steers has just been completed at the Pennsylvania Experiment Station, in co-operation with the United States Department of Agriculture.

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Calorimetry, ("heat measurement"), the art of measuring the quantity of heat that a body absorbs or emits when it passes from one temperature to another, or when it undergoes some definite change of state. In order to execute such measurements it is first necessary to adopt some convenient and accurate unit, in terms of which the quantities of heat that are to be measured can be expressed. Several such units have been proposed, but none has yet met with universal favor among physicists. One of the simplest that has been suggested (at least so far as the principles involved are concerned) is the quantity of heat that is required to melt a kilogram or a pound of ice. Evidently it will require precisely 10 times as much heat to melt 10 pounds of ice as to melt one pound, and hence, if the quantity of heat required to melt one pound of ice is taken as the unit of heat, the measurement of any given quantity of heat becomes reduced to the simple operation of observing how many pounds of ice the proposed quantity of heat can melt. The earliest form of heat-measuring device (or "calorimeter") based upon this idea is that invented by Dr. Joseph Black about the year 1760. It consists simply of a block of clear ice, in which a cavity is made, the cavity being closed by a slab of ice laid upon the main block. To make the use of this device plain, let us suppose that it is desired to determine the quantity of heat that is given out by a certain fragment of platinum in cooling from 100° F. to the freezing-point. The chamber in the block of ice is first carefully wiped dry, and the platinum, heated accurately to 100°, is quickly introduced, and the covering lid of ice is laid in place. The platinum gives up its heat to the ice about it, with the result that a certain weight of the ice is melted, and a corresponding weight of water collects within the chamber. When it is certain that the platinum has attained the temperature of the ice, the slab covering the excavation in the main block is lifted off, and the water that has collected about the platinum is removed and weighed. The quantity of heat given out by the platinum is then known at once, if the

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accepted unit of heat is the quantity required to melt one pound of ice. Lavoisier and Laplace improved Black's calorimeter in certain respects, while retaining its main features. Their instrument consists essentially of three distinct concentric chambers. The object upon which the experiment is to be performed is placed in the inner chamber, and the ice whose melting is to serve as a measure of the heat given out is placed, in the form of broken lumps, in the intermediate chamber, surrounding the object to be investigated. In the outer chamber, which encloses the other two as completely as possible, broken ice is also introduced, to prevent the conduction of heat into the apparatus from the outside. The quantity of ice melted is determined by observing the amount of water that is formed in the middle chamber, this being drawn off by a conveniently situated tube and tap. This apparatus has been described as an improvement upon that of Black; but the only way in which it can be said to be an improvement is in the respect that it does not call for large blocks of pure, clear ice. In other particulars it is somewhat inferior to the simpler apparatus of Black. The quantity of water that is produced, for example, cannot be determined with the same degree of accuracy in Lavoisier and Laplace's instrument. The ice calorimeter of Bunsen was a far greater advance. This ingenious apparatus consists of an inner chamber, for the reception of the object to be studied, and an outer enveloping one, which is entirely filled with a mixture of ice and water, and from which a graduated capillary tube is led away. The whole instrument is surrounded by broken ice, as in Lavoisier and Laplace's form, in order to protect the interior parts from the effect of external thermal influences. When the apparatus is in perfect working order, the mixture of ice and water in the intermediate chamber should be neither melting nor freezing, but should be in exact equilibrium in this respect. Upon the introduction of the object to be studied into the central chamber, the ice in the intermediate chamber begins to melt, just as in the types of calorimeter already considered; but the essential peculiarity of Bunsen's instrument consists in deducing the quantity of ice that is melted by observing the change of volume of the contents of the intermediate chamber, as shown by the motion of the water in the graduated capillary tube that leads away from that chamber; advantage being taken, for this purpose, of the known fact that ice diminishes in volume upon melting, so that when the exact diminution in the volume of the contents of the intermediate chamber is known, we can calculate with a considerable degree of precision the quantity of ice that has been melted. Bunsen's calorimeter is an admirable instrument, capable of giving results of great accuracy when intelligently handled.

Another unit of heat that suggests itself quite naturally is the quantity of heat given out by a pound of steam when it condenses into a pound of water at the same temperature. A calorimeter based upon this idea was also used by Bunsen, but the steam calorimeter was brought to its present excellent form largely through the labors of Dr. J. Joly. In his type of the instrument the object to be studied is suspended from one arm of a delicate balance. After being accurately counterpoised, the object

is bathed in an atmosphere of steam, with the result that it absorbs a certain amount of heat as its temperature rises to that of the steam. But the heat thus absorbed by the body under examination can be obtained only from the steam itself; and, since saturated steam cannot part with heat in this way without condensing, it follows that there is deposited upon the body a weight of condensed moisture that corresponds precisely to the quantity of heat that has been absorbed. The amount of this moisture is determined by careful weighing; and it is evident that the quantity of heat absorbed by the experimental body in passing from its original temperature to the temperature of the steam is then immediately known, if we take, as the unit of heat, the quantity of heat that is given out by a pound of steam in condensing into a pound of water at the same temperature. In practice, numerous corrections are of course necessary, as with all other instruments of precision. It may be added that although the ice and the steam calorimeters are primarily intended to determine the heat emitted or absorbed by a body in passing from any given temperature to some one particular temperature that is always the same (that is, the freezing-point in the one case and the boiling-point in the other), yet it is always possible to determine the quantity of heat emitted or absorbed by the body between any two temperatures, by performing two experiments in succession, the body having these respective temperatures as its initial temperatures in the respective experiments. It is plain that the quantity of heat emitted or absorbed between the proposed initial and terminal temperatures can then be obtained by simply subtracting one of these results from the other.

Another and more familiar unit of heat is the quantity of heat required to warm a given weight of water by one degree on a given thermometric scale. (See CALORIC.) Thus in general engineering practice in the United States and in England, it is customary to define a heat unit as the quantity of heat that is required in order to raise the temperature of a pound of water one degree on the Fahrenheit scale. This definition is good enough for rough purposes, because it conveniently happens that there is no great difference between the quantity of heat required to warm a pound of water from 32° to 33° and the quantity required (for example) to warm it from 99° to 100° . This, however, we can only regard as a fortunate accident; and for accurate scientific purposes we must recognize that the equality is only approximate, and we must adopt some particular temperature range as a part of our definition. Thus it is common to define the British heat unit, when great accuracy is desired, as the quantity of heat required to raise the temperature of a pound of water from 59° to 60° ; although some authorities, apparently without sufficient reason, make the temperature range from 32° to 33° , and others have chosen other positions on the temperature scale for the defining degree. It is unfortunate that no general agreement has yet been reached on this point. In accurate scientific work the unit of heat is usually taken as the quantity of heat required to warm a kilogram of water from 15° C. to 16° C., or (which is practically the same thing) from 14.5° to 15.5° C. It would appear that several very good reasons could be assigned for selecting 40° C.

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as the standard temperature to be used in defining the heat unit. For example, the specific heat of water has its minimum value not far from that point; or, in other words, any small uncertainty in the actual realization of the temperature contained in the definition would have little or no effect if that temperature were 40° C. Again, 40° C. is the temperature at or near which the differences between the various thermometric scales that are in practical use reach their maximum; and this means that at or near this temperature a slight error in the standardization of the thermometer that is used would have the least effect upon the verification of the heat unit. Moreover, 40° C. (104° F.) is a temperature that is likely to be always greater than the general temperature of the laboratory in which work is being carried out; and it is well known to be easier to realize a temperature that is higher than that of the surrounding air, than it is to realize one that is lower. From every point of view, therefore, 40° C. (or thereabouts) would appear to be the best temperature to assume in establishing the definition of the heat unit; a unit of heat being then defined as the quantity of heat required to raise the temperature of a kilogram of water from (say) 39° C. to 40° C. Yet, cogent as these reasons would appear, no authority has yet suggested this particular temperature as the standard.

In measuring the quantity of heat emitted by a body by observing the change of temperature produced in a given mass of water when the water absorbs the heat so emitted, a great variety of forms of apparatus may be used. In some cases the heated body may be plunged into the water directly, the water being kept well stirred, and its temperature taken at the beginning and end of the experiment. In other cases, and especially when the body under examination cannot be allowed to come in contact with the water, it is necessary to adopt some more elaborate method, such as enclosing the experimental body in a water-tight envelope of some kind, and afterward making due allowance for the heat capacity of the envelope. In cases, for example, in which the heat generated by the combustion of fuel is to be measured, the fuel must be enclosed in an air-tight crucible, to which oxygen is admitted by one tube, and from which the products of combustion are drawn off by another. The crucible is surrounded by a mass of water that is disposed in such a way as to intercept and absorb as much of the heat that is produced as possible. A direct observation of the temperature of the water in the calorimeter is made before and after the combustion, and the change of temperature so obtained gives a first approximation to the amount of heat that has been liberated. This result has to be corrected, however, for the thermal capacity of each part of the calorimeter that has been warmed during the experiment, and for that of the gases admitted and drawn off, and also for any loss of heat that may have occurred through radiation. The precise details of the corrections will vary, however, with the design of the calorimeter, and with the mode of conducting the experiments.

For a discussion of the relations of the different units of heat that have been mentioned above, and for an account of the experiments that have been made for determining the differences in the heat capacities of water at

different temperatures, see **HEAT**. A very good account of the subject of calorimetry in general will be found in Preston's 'Theory of Heat,' which also contains valuable references to original papers. The various forms of calorimeter that are used in practical engineering are explained and illustrated in Carpenter's 'Text-Book of Experimental Engineering.'

Calotropis, a genus of asclepiads forming shrubs or small trees, natives of the tropics of Asia and Africa. There are three species, and their flowers have a somewhat bell-shaped corolla, expanding into five divisions. *C. gigantea*, the largest of the genus, forms a branching shrub or small tree about 15 feet high, with a short trunk four or five inches in diameter. Its flowers are of a pretty rose-purple color. Cloth and paper have been made from the silky down of the seeds. The bark of the roots of several of the species furnishes the substance called mudar, which is used in India as a diaphoretic. The juice has been found very efficacious in the cure of elephantiasis, in syphilis, and anasarca. From the bark of the plant is made a substance called mudarine. The bark of the young branches also yields a valuable fibre. The leaves warmed and moistened with oil are applied as a dry fomentation in pains of the stomach; they are a valuable rubefacient. The root, reduced to powder, is given in India to horses. An intoxicating liquor, called bar, is made from the mudar by the hillmen about Mahabuleswar, in the western Ghauts.

Calot'tists (French, *Calottistes*, ka-lō-těst'), or the RÉGIMENT DE LA CALOTTE, a society which sprang up at Paris in the last years of the reign of Louis XIV., and took their name from the word *calotte*, a flat cap formerly worn by the priests, which was the symbol of the society. All were admitted whose odd behavior or character, foolish opinions, etc., had exposed them to public criticism. Every one who made himself particularly ridiculous received letters-patent, authorizing him to wear the calotte. They had a singular coat of arms, on which was the sceptre of Momus, with bells, apes, rattles, etc. On their principal standard were the words, *Favet Momus, luna influit*. On the death of Torsac, the colonel of the Calot'tists, the *éloge* (a spirited satire on the academical style), which the Calot'tists pronounced on this occasion, was suppressed. Aimon, colonel of the guards, hastened to Marshal Villars with their complaints, and concluded with the words, "My lord, since the death of Alexander and Cæsar, the Calot'tists have not had any protector besides you," and the order was retracted. They became, however, too bold, attacked the ministers and even the king himself; and the regiment was in consequence dissolved. After the restoration the epithet *Régime de la Calotte*, was applied to the clerical influence in politics.

Cal'otype, a photographic process invented by Talbot. Paper saturated with iodide of silver is exposed to the action of light, the latent image being subsequently developed and fixed by hyposulphite of soda.

Calo'vius (Latinized form of original German name, KALAU), **Abraham**, German polemic: b. Mohrunge, Prussia, 16 April 1612; d. 25 Feb. 1686. He was the chief representative of controversial Lutheran orthodoxy in the 17th century, and waged war

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incessantly on Arminian, Socinian, Reformed, and Roman Catholic doctrines, and with the greatest bitterness against Calixtus. He was six times married, the last time in his 72d year. His chief writings are: 'System of Theological Locations'; 'History of Syncretism'.

Caloy'ers, (*καλός*, "beautiful," "good"; and *γέρον*, "an old man"), Greek monks belonging with a few exceptions to the order of St. Basil, who led a very austere life, eating no meat and observing the fasts of the Greek Church very rigidly. They do not even eat bread unless they have earned it. During their seven weeks of Lent they pass the greatest part of the night in weeping and lamentations for their own sins and for those of others. The caloyers of the Greek Church occupy a position of much greater importance than the members of the religious fraternities of the Church of Rome, inasmuch as all the higher Church dignitaries—bishops, archbishops, and patriarchs are chosen from their number. They are, indeed, the only individuals in the Greek Church who are instructed in theology, and even among them the amount of theological learning is very limited. They are commonly educated at the monasteries on Mount Athos, and on the Isle of Patmos, but besides these there are many monasteries dispersed over the archipelago and the Morea, and a few elsewhere belonging to this class of monks. Their most celebrated monastery in Asia is at Mount Sinai. They do not all agree as to their mode of life. Some of them are cenobites; that is, they live in common. Others are anchorites, living alone, or with only one or two companions; and others again are recluses, who live in grottoes or caverns in the greatest retirement, and are supported by alms supplied to them by the monasteries. There are also convents of female caloyers. The Turks sometimes call their dervishes by this name.

Calpe, *kāl'pē*, the ancient name of the rock of Gibraltar (q.v.), at the southern extremity of Spain, the northern of the two hills called by the ancients the "Pillars of Hercules." Across the straits of Gibraltar, on the African coast, was Abyla, the southern pillar.

Calpee. See **CALPI**.

Calprenède, Gautier de Costes de la, French romance writer: b. Tolgou, Gascony, 1610; d. Paris, 1663. He was an officer of the guards and royal chamberlain, and one of the authors who in the 17th century brought into fashion a new kind of voluminous and long-spun romances of chivalry. He wrote: 'Cassandra'; 'Cleopatra'; and 'Pharamond,' besides some tragedies. His romances were highly celebrated, and are the best of their kind.

Calpurnia, the fourth wife of Julius Cæsar, married to him 59 B.C. She was a daughter of L. Calpurnius Piso Cæsonius, who was consul 58 B.C. Shakespeare introduces her into his tragedy, 'Julius Cæsar.'

Calpurnius, Titus, surnamed **Siculus**, Latin poet: b. about 30 A.D.; d. about 80. Eleven eclogues composed by him are extant, but nothing whatever is known with certainty about his life, and even his name is doubtful. The poems attributed to him are evidently modeled on Virgil's more famous eclogues. They are

smooth, flowing, and melodious, but lacking in simplicity and naturalness.

Caltanissetta, *kāl-ta-nē-sēt'ta*, Sicily, capital of the province of the same name, on the right bank of the Salso, 62 miles southeast of Palermo. It is fortified, and has a citadel and cathedral, broad streets, and well-built houses. In the vicinity, at Terra Pilata, are springs of petroleum and of hydrogen gas, a mud-volcano, and important sulphur mines, producing annually about 5,500 tons. Caltanissetta owes its origin to the Saracens, by whom it was called *Kalat al Nisa* ("the lady's castle"). Pop. (1901) 44,600. The province of the same name has an area of 1,445 square miles. Pop. 330,972.

Caltha, the genus of ranunculaceous plants to which the marsh-marigold (*C. palustris*) belongs. See **MARSH-MARIGOLD**.

Cal'throp, Samuel Robert, American Unitarian clergyman: b. Swinhead Abbey, Lincolnshire, England, 7 Oct. 1829. He was educated at Cambridge University and came to the United States in 1853. He entered the Unitarian ministry in 1860 and has been pastor of a church in Syracuse, N. Y., for several years. He has published 'Essay on Religion and Science'; 'The Rights of the Body'; 'The Primitive Gospel and Its Life of Jesus.'

Calton Hill, a hill in the city of Edinburgh at the eastern end of Princes Street. It is rocky, and has a broad, grassy summit, which commands a view of the Forth and the surrounding country. On the hill are monuments in memory of Dugald Stewart and Lord Nelson, and one in commemoration of the victory at Waterloo.

Caltonica, Sicily, a town in the province of Girgenti, situated 15 miles northwest of the town of Girgenti. The sulphur works in the neighborhood produce annually upward of 1,000 tons of sulphur. Salt is also manufactured in the district. Pop. 7,000.

Caltrop, a kind of thistle growing in southern Europe. It is armed with prickles, which, if trodden on by men or animals, are capable of wounding. Hence in the military art the name of caltrop is given to an instrument with four iron points disposed in a triangular form, three of them being turned to the ground, and the other pointing upward. They are used to impede the progress of cavalry.

Calumba, or **Colombo**, the root of the *Cocculus palmatus*, a herbaceous plant, belonging to the natural order *Menispermaceæ*, which grows in Ceylon in the neighborhood of Colombo, whence it is said to derive its name. It is imported in the form of round slices or cut pieces, the interior of which is of a greenish-yellow color, while its thick and furrowed skin is greenish-brown; its odor is slightly aromatic, but somewhat nauseous; its taste extremely bitter. Calumba is often administered as a tonic, and is considered an excellent stomachic. It is regarded as of great value in chronic diarrhoea and dysentery; but it is necessary that all symptoms of inflammation should have disappeared before it can be used. It is usually given as a decoction, less commonly in the form of pills or powders. The root of a gentian, the *Frasera Walteri*, is sometimes substituted for the true calumba, and is

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hence frequently called the false calumba. It is not very bitter, and is almost without smell; it has no very marked effects.

Calumet, Mich., a township in Houghton County, at the terminus of the Mineral Range R.R., 42 miles north of L'Anse. It is the seat of the famous Calumet and Hecla copper mine, the richest in the world, producing nearly 50,000 tons a year. It is the trade and supply centre of the Superior mining district, and has a national bank, several weekly newspapers, manufactories, and an assessed property valuation of over \$26,000,000. Pop. (1900) 25,991.

Calumet, the pipe of peace, a tobacco-pipe used by the North American Indians. On ceremonial occasions, as when Indian chiefs and warriors meet in peace, or at the close of a war with those of another nation, in their talks and treaties with the whites, or even when a single person of distinction comes among them, the calumet is handed round with ceremonies peculiar to each tribe, and each member of the company draws a few whiffs. To accept the calumet is to agree to the terms proposed; to refuse it is to reject them. Some symbols of amity are found among all nations; the white flag or flag of truce of the moderns, and the olive branch of the ancients are similar in character to the Indian calumet. There is also, it appears, a calumet used in the ceremonial declaration of war, and differently made from that of peace. Tobacco is smoked in the calumet, and the leaves of various other kinds of plants. The bowl of this pipe is made of different kinds of soft stone, especially a kind of red soapstone, and the stem of a reed, or of some light kind of wood which is easily perforated. This stem is adorned in various ways; sometimes it is marked with the figures of animals and hieroglyphical delineations, and almost universally has beautiful feathers attached to it, disposed according to the taste of the individual, or of the tribe to which he belongs.

Calumpit, Philippines, a town of the province of Bulacan, situated in the southwestern part of the island of Luzon on the Pampanga River. It is about 27 miles northwest of Manila, with which it is connected by rail. Pop. about 15,000.

Calvados, käl'vā-dös, France, a department in Normandy, bounded on the north by the English Channel, east by the department Eure, south by Orne and La Manche, and west by La Manche. Area, 2,145 square miles. It comprises the ancient Auge, Bessin, and part of Lieuvin. The region is undulating and picturesque, and possesses rich pastures. The principal rivers are the Touques, Dives, Orne, and Vire, which are navigable for small vessels. Agriculture is in a more advanced state than in many other parts of France. Dairies are numerous and well managed, and large herds of cattle are brought in from the departments of Finisterre, Côtes-du-Nord, etc., to be fattened on the pastures for the markets of Paris, Rouen, and Caen. Horses of the Norman breed are extensively reared and held in high estimation. The principal manufactures are linen and lace. The latter, near Caen and Bayeux, employs about 50,000 hands. About 25,000,000 of oysters, procured in the roads of

Cancale, are annually laid down in beds at the mouth of the Seulles. The department is divided into six arrondissements, containing 37 cantons. Chief town, Caen. Pop. (1901) 407,639.

Calvados, a dangerous ridge of rocks on the northern coast of Normandy in lat. 49° 22' N., and extending to the west of Orne for the space of 10 or 12 miles. It is so called from a vessel belonging to the Spanish Armada which was wrecked on it, and gives its name to the department.

Calvaert, käl'vart, **Dionys** (called in Italy DIONISIO FLAMMINGO), Flemish painter: b. Antwerp, 1555; d. Bologna, Italy, 17 March 1619. He went very young to Italy as a landscape painter, where, in order to learn how to draw figures, he entered the school of Fontana and Sabbatini, in Bologna, with the latter of whom he visited Rome. After having passed some time in copying the paintings of Raphael, he opened a school at Bologna, from which proceeded 137 masters, and among these Albano, Guido, and Domenichino. The Bolognese regarded him as one of the restorers of their school, particularly in respect to coloring. Calvaert understood perspective, anatomy, and architecture; but the attitudes of his figures are sometimes mean and exaggerated. His best paintings are to be seen at Bologna.

Calvary, the English name for the eminence which was the scene of the crucifixion of Jesus Christ. It lay beyond but near Jerusalem, and by some is identified with the old House of Stoning, or place of public execution, according to the law of Moses, on the top of the remarkable knoll outside the Damascus gate, on the north side of Jerusalem. It was from this cliff that the criminal used to be flung before being stoned (according to the Talmud), and on it his body was afterward crucified; for the spot commands a view all over the city, and from the slopes round it the whole population might easily witness the execution.

Calvé, kal'vā, **Emma**, French opera singer: b. Madrid, Spain, 1864. Her real name is Emma de Roquer. She was born of a French mother and Spanish father, and was educated in a convent school in the south of France. She made her début at Brussels in Gounod's 'Faust.' She has made successful tours of the United States in leading roles, her first appearance in New York being on 29 Nov. 1893.

Calverley, käl'ver lī, **Charles**, American sculptor: b. Albany, N. Y., 1 Nov. 1833. He has won distinction with groups and figures and portrait busts of Greeley, Cooper, Howe, etc. He was elected to the National Academy of Design in 1875.

Calverley, **Charles Stuart**, English poet, son of the Rev. Henry Blayds: b. Martley, Worcestershire, 22 Dec. 1831; d. London, 17 Feb. 1884. In 1852 his father dropped the name of Blayds and resumed that of Calverley, formerly borne by his family. He was educated at Christ's College, Cambridge, and during his college career showed great skill in Latin and Greek composition, and in 1856 was second in the classical tripos. As a writer of humorous English verse he also made himself famous.

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He afterward studied for the bar, and was called in 1865, but his promising legal career was cut short by a serious accident which befell him on the ice in the winter of 1866-7. The effects of this misfortune clouded the whole of the remainder of his life. As a parodist and writer of light verses Calverley is perhaps unequaled, but his published volumes are not numerous. The earliest of them appeared in 1862 under the title of 'Verses and Translations'; and the others are 'Translations into English and Latin' (1866); 'Theocritus Translated into English Verse' (1869); and 'Fly Leaves' (1872). A 'Memoir and Literary Remains' were published in 1885 by Scudall.

Cal'vert, George. See BALTIMORE FAMILY.

Calvert, George Henry, American writer: b. Baltimore, Md., 2 Jan. 1803; d. Newport, R. I., 24 May 1889. He was a great-grandson of Lord Baltimore. After graduating at Harvard in 1823, he studied in Germany; then returning to Baltimore, became editor of the 'American' and a contributor to various periodicals. His published books include 'Poems' (1847); 'Joan of Arc' (1860); 'Goethe, his Life and Works' (1872); 'Brief Essays and Brevities' (1874), and 'Wordsworth: a Biographic Esthetic Study' (1875); 'Three Score and Other Poems' (1883).

Calvert, Leonard. See BALTIMORE FAMILY.

Calvi, Lazzaro and Pantaleone, latz-ä'rō and pan-ta-lā-ō'nē kal'vē, Genoese painters, sons of Agostino Calvi: the former b. 1502; d. 1606; the latter died 1595. They painted in concert many pictures in Genoa, Monaco, and Naples. In particular, the façade of the Palazzo Doria (now Spinola), a spirited composition crowded with figures, is highly extolled. Lazzaro was the more inventive genius of the two, his brother generally working out the details of their joint productions.

Calvin (Modified from the French form *Cauvin* or *Caulvin*), **John.** Swiss reformer of the 16th century. B. Noyon, Picardie, 10 July, 1509; d. Geneva, Switzerland, 27 May, 1564. Though born in humble condition, his father, by virtue of certain official relations that he sustained to the ecclesiastical court and diocese of Noyon was able by personal influence to further the interests of his family. Calvin's mother was distinguished alike by personal beauty and piety. Even as a lad Calvin was deficient in physical vigor, but gave early tokens of more than ordinary intellectual powers, a circumstance that attracted to him the regards of a noble family at Noyon who received him under their care and gave to him the same opportunities of schooling as were enjoyed by their own children (1523). It was his father's original intention to fit him for the priesthood and in pursuance of that object he was sent to the Collège de la Marche at Paris; then to the Collège Montaigu where he was trained in logic by a learned Spaniard who afterward directed the education of Ignatius Loyola while a student at the same school. He easily stood in the front rank of his fellow-students but was little disposed to affiliate with them and from a certain unsocial severity of bearing acquired among them the nickname of the "Accusative Case."

He was already 18 and had done some preaching when from motives of ambition his father changed his plans with reference to him and determined to have him prepared for the profession of the law, putting him for that purpose under instruction at Orléans (1528) and Bourges (1530), where he applied himself to his studies with the same assiduity evinced at Paris, and attained immediate distinction though at the expense of impaired health. Without confining himself strictly to the curriculum of the school he devoted himself at the same time to the study of Greek under the German Professor Wolmar, whose Protestant views strengthened the bias toward the new faith already existing in his pupil's mind, for his attention had previously been drawn to the careful study of the Scriptures by his kinsman Olivetan, the first Protestant translator of the Bible into French. When Calvin was 22 his father died, whereupon the young man gave up his law studies and returned to Paris and theology, issuing soon after his first publication, an annotated edition of Seneca's "De Clementia."

Up to this point it is safe to presume that his interests and ambitions were purely those of a humanist, and whatever thought he may have had in regard to the need of reform in the matters of church doctrine and discipline, he doubtless felt with Erasmus and Reuchlin that all the reforms that might be required would come about as the result of completer knowledge.

It was not long after this that he experienced what he calls his "sudden conversion." He writes: "After my heart had long been prepared by the most earnest self-examination, on a sudden the full knowledge of the truth, like a bright light, disclosed to me the abyss of errors in which I was weltering, the sin and shame with which I was defiled." His experience is near of kin to that of Luther, and we are set thinking also of the "great light" that shone upon Saul as he was nearing Damascus. Yet with all the profound disclosure thus made to him, he still felt no special call to the work of preaching the reformed doctrine, and sought only for the undisturbed retirement that would permit him farther prosecution of his studies.

His friend Nicholas Cop had been elected to the rectorship of the University of Paris and at his request Calvin prepared for him an inaugural address which was substantially a defence of the reformed doctrine (1533). To the Sorbonnists this was intolerable, and Calvin was obliged to escape to Basel, where in 1536, at the age of 26, he published his "Institutes." This remarkable work was intended to be a vindication of the Protestant doctrine, and its dedication to the reigning King, Francis I, sought to create royal sympathy for the cause and for its persecuted adherents. It has been claimed that no other work, written at so early an age, has produced such a marked influence upon the opinions and practices both of contemporaries and posterity. Although the book as then composed was but the germ of what it was subsequently developed into, yet the line initially laid down in it Calvin never swerved from. By his Catholic opponents his work was styled the "Koran of the heretics."

CALVIN

From Basel he made a secret visit to his old home in Picardie, returning by way of Geneva, where he arrived on the 5th of August, 1536. Here it had been his intention to remain but a single night. The situation, political and religious, which he there confronted, however, vetoed his plans and really determined his entire subsequent career. That situation briefly outlined is as follows: The Duke of Savoy, unable to secure the submission of Geneva, had by the aid of Pope Leo X forced upon the city the reluctant acceptance of John, the Bastard of Savoy, as bishop, it being stipulated that the civil administration of the city should be vested in the Duke. The Genevese revolted under the lead of Berthelier and Bonniard, but were defeated, Berthelier was executed and Bonniard became the 'Prisoner of Chillon' (1530-1536). Defeat did not however extinguish the spirit of revolt. Of the two parties into which the Genevese were divided the Confederates ("Eidgenossen," a word from which perhaps comes the word Huguenot) looked for relief to the Swiss and the Mamelukes favored supporting the Duke. The Confederates prevailed, the Duke was worsted and all power both military and civil passed into the hands of the people. This was in 1533.

To this civil overturning succeeded an ecclesiastical revolution. Protestant tendencies had established themselves in Bern, and from there had extended themselves to Geneva. The struggle in the latter place was a severe one, but Protestantism gained ground till under the leadership of Farel and with the assistance of Bern an ecclesiastical reconstruction was effected, the Bishop driven out, Protestantism established, and Geneva left independent. This meant not only a new form of doctrine and mode of worship, but a reformed system of morals, and thereby a strain put upon the large profligate element of the population that soon worked a reaction strenuously encouraged by the Savoyards and the Romish priests. The entire city was in this way wrought into a condition of tumultuous faction, and it was just in the midst of this warring of civil, moral and ecclesiastical elements that Calvin arrived at Geneva as already stated, and took lodgings for the night with the distinct intention of going on to Basel the next day. Farel who was in charge of the Protestant movement accidentally learned of Calvin's presence in the city, got into communication with him, and in an interview graphically described by Calvin in the preface to his "Commentary on the Psalms" (a work especially rich in autobiographical references), entreated him to remain and help work out the problem of Protestantism in Geneva, denouncing upon him the curse of God if he refused. Calvin was awe-stricken by what seemed to him the prophetic deliverance of Farel and yielded to his Elijah-like expostulation, so that the dictum is well justified that "Farel gave Geneva to the reformation and Calvin to Geneva."

He prefaced his work in Geneva by introducing and setting in operation a system of stringent regulations relative to doctrine, discipline and daily conduct. Amusements like dancing and card-playing were punishable offences, not because in his judgment inherently wrong, but because so abused that the only safe course was to prohibit them altogether. The stringency of

this policy excited a revolt led by the Libertines, so styled, and participated in even by many of the same "Eidgenossen" that had helped wrest Geneva from the grasp of the Duke. The opposition culminated in an act of Council expelling Calvin and Farel from the city (1538), the latter going to Neuchâtel, and Calvin to Strasburg, where, with a sense of relief, he thought to find himself free to gratify his tastes and resume his studies. Here again, however, as at Geneva, he was stirred by an intimidating call and applied himself to the work of ministering to the French refugees there gathered. It was during his stay in Strasburg that he married a lady of admirable character, with whom he lived in relations of tender attachment till her death nine years later, their only child, a son, dying in early infancy.

In Geneva, in the meantime, matters had been going from bad to worse, till by the united voice of government and people Calvin was recalled. Crime and vice had become rampant. Catholics were scheming for the restoration of the old faith. Cardinal Sordélet had addressed to the people a flattering and cajoling letter calculated to win them back to the Papal Church. To that letter Calvin while still in Strasburg had published a reply both sagacious and masterly. Bern was suspected of having ambitious political designs on the city. The local government was too weak to maintain itself amid such a storm of conflicting elements and so after three years the people turned again helplessly to the man they had exiled. He fought against the overtures tendered him but was overborne by their earnestness and unanimity and came back to Geneva to make there his life-long home (1541).

Calvin entered at once upon his office of administrative head of the city considered in both its ecclesiastical and civic character. Though combining the two in his own person he was no Erastian, and Church and State stood to him as theoretically distinct, and yet contributing, each, to the interests of the other, the Church infusing its spirit into the State and the State in turn furnishing authoritative support to the Church. Civil authority which had previously been widely distributed he made more oligarchic and vested it primarily in what was known as the Little Council of twenty-five. The code devised for the city bears everywhere the marks of Calvin's authorship. For this his legal training especially qualified him. Larger and smaller matters alike came under his purview. Like the English Alfred the Genevese legislator braced his system of enactments by a liberal infusion of the Mosaic letter and spirit. Ecclesiastical discipline was delegated to the Consistory composed at first of 18 members, 6 clerical and 12 lay, with Calvin as its president. The city was divided into districts or parishes and a system of vigilance so thoroughly organized that every family was at least once a year visited by responsible parties for purposes of censure, counsel or relief.

Although introducing his administration with a measure of moderation its animus soon evinced itself in a way that made evident to the lawless and vicious classes what it was they had to contend with, and a wide-reaching opposition began immediately to organize itself. This opposition included the Libertines and the "Patriots," which latter class bitterly opposed

CALVIN — CALVINISTIC METHODISTS

the close aristocratic lines with which the previous popular government had been replaced, and regarded with jealousy the foreigners that in great numbers were coming to make their home at Geneva. The enmity toward him and his administration was still farther fomented by the irrational and merciless severity shown in the punishment of small offences, such as the beheading of a child for striking its mother, the committal of heretics to the flames, the eliciting of testimony by torture. His rule was one of terror and he was both feared and hated. Mobs attempted to intimidate him. Dogs in the street were named after him. To antagonize Calvin was a crime, as Castellio found to his cost, and to speak disrespectfully of predestination, as did Bolsec, a felony. But cases like these two are quite eclipsed by the instance of Servetus.

Servetus was a Spaniard, a scholar of independent thought, who convinced himself of the groundlessness of papal claims, but without cordially accepting the theology of Protestantism. In 1531 he published a book entitled "The Errors of the Trinity." Irritated by Calvin's treatment of him and his speculations he resorted upon him and the reformed doctrine flatly and acrimoniously. Though out of sympathy with the Roman Catholic Church Servetus continued for twenty years in outward conformity with its doctrine and discipline and then wrote another volume under the title "The Restoration of Christianity." This was issued by him during his residence at Vienne and resulted in his arrest at the instance of the Archbishop. A copy of the work came under Calvin's eye, who declared that if Servetus were to come to Geneva he should not get away alive if his authority was sufficient to prevent it. Having escaped from Vienne Servetus did come to Geneva, where his presence soon reached the knowledge of Calvin, who ordered his arrest. Thirty-eight heretical propositions were alleged against him, among others the rejection of the Trinity and speculations leaning toward pantheism; and, although he conducted his defence with vigor and with a degree of acuteness, he was condemned and, to the disgrace of the Protestant cause, was burned a little way out from Geneva on the 27th of October 1553. It is claimed in behalf of Calvin that he tried to mitigate the severity of the penalty. However that may be, he was set on pursuing Servetus to the death, and it is on record that he wrote as follows to Farel two months before the execution,—"I hope the sentence will be capital but desire the atrocity of the punishment to be mitigated." It has to be remembered however that all of this was in keeping with the barbarism of the age and that so gracious-spirited a man as Melancthon gave to it his assent.

During the entire course of his conflict with heresy and the Libertines, Calvin was actively engaged in preaching and lecturing. He had crowds of hearers from all parts of Europe. Protestant refugees were in attendance upon his lectures and discourses and went back carrying with them the impression made upon them by his doctrines and personality. Thus was he able to stamp himself ineffaceably upon the religious thought of his own and aftertimes, and to cause Geneva to sustain to the Latin nations in particular a relation similar to that subsisting between Wittenberg and the Germanic. The

weight and permanence of the influence he exerted was due partly to his own idiosyncrasies. Both his mode of thinking and his policy of action were measurably determined by his natural temperament and his physical debility. He was composed principally of will and brain, with too little of the tenderer sensibilities to sweeten the action of the one or to rectify the aberrations of the other. Naturally enough then he made the doctrine of God's sovereignty the key-stone of his system, and could conceive of heresy as being none other than the unpardonable sin. The same combination of volitional and intellectual genius made him also a born organizer enabling him to compact and mature the reform tendencies of the times into a corporate whole where before everything had been incipient and sporadic.

Calvinism is Augustinianism in its developed and protestant form, the two theologians coinciding in their views of predestination, sin, and grace, though differing in the matter of justification and other less important matters. The keynote of Calvinism is not predestination, as is sometimes claimed, but divine sovereignty, out of which, understood as Augustine and Calvin understood it, predestination issues as a necessary corollary. Predestination so derived carries with it perforce the notion that those who are elected to be saved are so elected by the arbitrary action of the divine will;—"He hath mercy on whom he will have mercy, and whom he will he hardeneth." The motive therefore leading to God's exercise of grace in specific cases has its inexplicable grounds in the mind of God, and is nowise referable to any condition existent in the sinner. 'Infralapsarianism,' 'Permissive Decree,' etc., are merely philosophical attempts to relieve divine arbitrariness from the charge of immorality.

For a detailed history of the life of Calvin see Merle d'Aubigné's 'History of the Reformation in Europe in the Time of Calvin.' For a briefer outline of the same consult G. P. Fisher, 'The Reformation.' See also under 'Calvin' and 'Calvinism' in Schaff-Herzog Encyclopedia of Religious Knowledge. A very complete Bibliography is given in Schaff's 'Creeds of Christendom.'

C. H. PARKHURST, D. D.

Calvin, Samuel, Scottish-American scientist: b Wigtownshire, Scotland, 2 Feb. 1840. He came to the United States when a youth and served in the Civil War. He studied geology as a life pursuit, and since 1874 has been professor of geology at the University of Iowa, and State geologist of Iowa since 1892. He is an editor of the 'American Geologist.'

Calvinism. See CALVIN, JOHN.

Calvinistic Methodists, a section of the Methodists in Great Britain, distinguished by their Calvinistic sentiments from the ordinary Wesleyans, who are Arminian. Wesley and Whitefield, the colleagues in the great evangelistic movement in the 18th century, differed with regard to the doctrines of grace, Wesley being Arminian, and Whitefield Calvinistic. Whitefield may be regarded as the founder of Calvinistic Methodism. Other names, and especially that of Howell Harries, of Trevecca, should be mentioned in connection with it. In its distinctive form it dates from 1725, but did

not completely sever its connection with the English Church till 1810. In government it is now Presbyterian. Its great seat is Wales. The Calvinistic Methodists exist in three divisions: the Whitefield Connection, 1741; Countess of Huntingdon's Connection (Huntingdonians), 1748; Welsh Methodists, 1750.

Calvo, kal'vō, **Carlos**, Argentine jurist and author: b. Buenos Ayres, 26 Feb. 1824; d. Paris, 4 May 1893. On 25 June 1860 he was accredited to the courts of Paris and London as minister plenipotentiary, and resigned after having fulfilled his special mission. In 1885 he became Argentine minister at Berlin. In 1869 he was elected a corresponding member of the Paris Academy of Moral and Political Sciences, and later received the decoration of an officer of the Legion of Honor. He wrote numerous works, mostly in French, the most important of which are: 'Complete Collection of Treaties, Conventions, and Other Diplomatic Acts of All the Latin-American States' (11 vols., 1862-9); 'Historical Annals of the Revolution in Latin America' (15 vols., 1864, and later dates); 'International Law in Theory and Practice' (2 vols., 1870-2; 3d ed. 5 vols., 1881-8), a work considered by jurists as one of the most remarkable on its subject; 'Study on Emigration and Colonization' (1875); 'Dictionary of Public and Private International Law' (2 vols., 1885); 'Manual of Public and Private International Law' (3d ed. 1892).

Cal'vus, Gai'us Licin'ius Ma'cer, Roman orator and poet, a son of the annalist and orator of the same name: b. 82 B.C.; d. about 47. He left 21 orations, but few fragments survive. One of these, against Vatinius, whose counsel Cicero was, produced so powerful an effect that the accused interrupted the orator and exclaimed, "Judges, am I to be condemned because my accuser is eloquent?" His poems were ranked with those of Catullus.

Calx, properly lime or calk (hence "calcareous earth"); but the term is more generally applied to the residuum of a metal or mineral which has been subjected to violent heat, burning, or calcination, solution by acids, or detonation by nitre, and which is or may be reduced to a fine powder.

Calycanthus, käl-i-kän'thus, a genus of plants of the natural order *Calycanthaceæ*. About a dozen species of American and Japanese fragrant shrubs often grown for ornament. *C. floridus*, and *C. glaucus* are found in the Alleghany Mountains from Pennsylvania southward; *C. occidentalis*, in California. They are popularly known as sweet-scented shrub and Carolina or American allspice. The leaves are green and rather large, and the flowers usually some shade of chocolate or purple. Both are sweet-scented. In the northern United States the species are scarcely hardy, though some thrive in the vicinity of New York city upon well-drained, rather rich soil in somewhat sheltered situations.

Calycifloræ, a subclass of exogenous or dicotyledonous plants, characterized by having both calyx and corolla, petals separate and stamens attached to the calyx.

Cal'ydon, an ancient city of Ætolia, celebrated in the stories of King Ceneus, the Calydonian boar, and Dejanira and Hercules.

Calydon, Forest of, a large forest mentioned in the Arthurian legends; it is supposed to have been in the northern part of England, or it may have been the wooded portion of the midland counties, which include also the "Sherwood" of Robin Hood.

Calydo'nian Boar, in Greek mythology, a boar sent to lay waste the fields of Ceneus, king of Calydon, the ancient capital of Ætolia, when he omitted a sacrifice to Artemis. The goddess sent the boar when Ceneus was absent on the Argonautic expedition. No one dared to face the monster, until Meleager, the son of Ceneus, with a band of heroes, pursued and slew him. The Curetes laid claim to the head and hide, but were driven off by Meleager. Later accounts make Meleager summon to the hunt heroes from all parts of Greece, among them the maiden Atalanta, who gave the monster the first wound.

Calymene, a genus belonging to the fossil order of the trilobites, characteristic of the Upper Silurian formations of Europe. In this genus the head is almost semicircular, and deeply divided by longitudinal furrows. The eyes are situated on the lateral lobes. The rings of the thorax and abdomen are difficult to distinguish from each other. The thoracic segments are from 10 to 14 in number. The abdominal rings are distinct and never attached to each other. The genus includes about 20 species, of which the *Calymene Blumenbachii* may be taken as the type. The members of this genus have the power of rolling themselves up like a ball.

Calypso, in Greek mythology, a daughter of Atlas (some say of Nereus and Doris, or of Oceanus and Thetis). She inhabited the woody island Ogygia, situated deep in the ocean, and lived remote from all intercourse with gods and men.

Calyptra, the hood of the theca or capsule of mosses. The same name is given to any hoodlike body connected with the organs of fructification in flowering plants.

Calyptræa, a genus of gasteropod mollusks belonging to the family of the *Calyptræida*, resembling limpets in certain characteristics, but differing from them in structure. This genus consists of small marine shellfish, conical in form, but sometimes very flat; they are fragile, and are distinguished by a conical shell or testaceous process attached to the bottom of the cavity of the shell. The branchiæ of this mollusk are composed of long and thin hairlike filaments. It is sometimes found as a fossil.

Calyx, in botany, the exterior covering of a flower; that is, the outermost floral envelope, consisting of a circle or whorl of leaves external to the corolla, which it encloses and supports. The parts or leaves which belong to it are called sepals; they may be united by their margins, or distinct, and are usually of a green color and of less delicate texture than the corolla. In many flowers, however (especially monocotyledons), there is little or no difference in character between calyx and corolla, in which case the whole gets the name of perianth.

CAM — CAMARASAURUS

Cam, **Auguste Nicolas**, ô-güst nĭk-ô-lă kăn, French sculptor: b. Paris, 1822. He was a pupil of Rude; his first works represent small animals, but he later chose the large beasts and birds of prey for his subjects. Among his best-known works are 'Linnets Defending Their Nest Against Rats'; 'Tiger in Conflict with a Crocodile'; and 'Eagle and Vulture Wrangling over the Carcass of a Bear.'

Cam, kăn, or **Caô**, kăn, **Diogo**, Portuguese explorer of the 15th century, who followed up the course of Prince Henry of Portugal, and in 1484 discovered the mouth of the Congo, near whose bank an inscribed stone erected by him as a memorial was found in 1887. He afterward examined the coast as far as lat. 22° S.

Cam, kăm, an English river formed by the junction of two streams, one of which (the Granta) rises in Essex and flows northwest, while the other (the Rhee) rises in the north of Hertfordshire, and flows northeast. The united stream flows sluggishly northward through Cambridgeshire, and falls into the Ouse some four miles south of Ely after a course of about 40 miles. The university town of Cambridge is situated on its banks a few miles below the confluence of the head-streams. It is navigable to Cambridge.

Cam, in machinery, a simple contrivance for converting a uniform rotary motion into a varied rectilinear motion, usually a projecting part of a wheel or other revolving piece so placed as to give an alternating or varying motion to another piece that comes in contact with it and is free to move only in a certain direction.

Cam and Isis, a familiar couplet by which the sister universities of Cambridge and Oxford are often mentioned. The allusion is to the rivers on which they are situated.

"May you, my Cam and Isis, preach it long;
The right divine of kings to govern wrong."
POPE, "The Dunciad."
"The drooping Muses, (Sir Industry.)
Brought to another Castale,
Where Isis many a famous nursing breeds
Or where old Cam soft passes o'er the lea,
In pensive mood."
THOMSON, "Castle of Indolence."

Camaieu, ka-mĭ'ū, or **Camayeu**, a painting wherein there is only one color, and where the lights and shades are of gold, wrought on a golden or azure ground. When the ground is yellow the French call it *cirage*; when gray, *grisaille*. This kind of work is chiefly used to represent bas-reliefs. The Greeks called pieces of this sort *μονοχρώματα*. The word is also applied to a painting in two or three different colors, which, however, do not represent the natural colors of the objects depicted.

Camajuani, kă-ma-hwă'nĕ, Cuba, an inland city in the province of Santa Clara. It has rail connection with the capital and other northern cities. Pop. about 5,000.

Camal'dolites, **Camaldulians**, or **Camaldunians**, a religious order established in 1012, by St. Romuald, a Benedictine of Ravenna, in the valley of Camaldoli, near Arezzo, in the Apennines, and confirmed afterward by Pope Alexander II. They were originally hermits living in separate cells, but as their wealth increased the greater part of them associated in

convents. They existed in Italy, France, Germany, and Poland. In the 18th century there were five independent fraternities of them, which are here mentioned in the order of their foundation: (1) at Camaldoli; (2) at Murano in the Venetian territory; (3) on Monte Corona, near Perugia; (4) at Turin; (5) the French fraternity, the first establishment of which was that of Notre Dame de la Consolation. They all had in common white garments, and the austere rules of the Benedictines. The hermits wore beards, and had still more severe rules than the monks in regard to fasting, silence, and penances. Their life was devoted to contemplation rather than to active work. A small branch of the order, consisting of nuns, was founded in 1086. There is in the vicinity of Naples a mountain which takes its name from a convent of the Camaldoli situated on its top, from which the traveler enjoys a prospect of remarkable grandeur and beauty. It is one of the most charming of all the beautiful views around Naples; yet the spot is not much visited by travelers.

Camalig, kă-mă-lĕg', Philippines, a town in the southeast part of the island of Luzon, situated within a few miles of the city of Albay. Pop. 14,868.

Cámara y Livermore, **Manuel de la**, mă'-noo-él dă la kă-mă-ra ĕ liv'er-môr, Spanish naval officer: b. in Malaga in 1836, his father being a Spaniard of the middle class, his mother an English woman. In 1903 he was in command of the *Escuadron de instruccion*, or training ships for cadets. During the Spanish-American war his name was associated with plans for the relief of the provincial capitals of the Spanish West and East Indies. First, in May 1898, it was suggested that a squadron, commanded by him as vice-admiral, might be sent from Spain for the relief of Havana. Second, a month later, he actually started to go to Manila, where Capt.-Gen. Augustin was shut in by Admiral Dewey and the insurgents. On 16 and 17 June the Cadiz reserve squadron under Admiral Cámara left port and sailed eastward through the Mediterranean. His fleet included troopships convoyed by the Pelayo and the best of the men-of-war, except those with Cervera in the West Indies. The United States consul at Port Said protested against permitting the Spanish fleet to refill its bunkers with coal there; nevertheless Cámara received orders to proceed through the Suez Canal. At this juncture an official bulletin of the navy department at Washington announced that Commodore Watson would "take under his command an armored squadron with cruisers and proceed at once to the Spanish coast." That was on 27 June. As though to emphasize the threat, came Cervera's defeat on 3 July. On 6 July Cámara's squadron was recalled to protect the Spanish coast; and so Watson's fleet, which had scarcely begun to exist, had yet completely fulfilled its destiny. Admiral Cámara's advancement to the grade he held in 1898 was very honorably won by service in Mexico, South America, Cuba (during the Ten Years' war), and the Philippines.

Camarasaurus, kă-ma-ră-sôr'us, a genus of amphibious dinosaurs (see DINOSAURIA), resembling the brontosaurus (q.v.), but of more massive proportions, with heavier fore limbs and shorter tail. An incomplete skeleton found in

CAMARGUE — CAMBACERES

the Jurassic strata near Cañon City, Col., was the first of these gigantic animals discovered in America. It was deposited in the American Museum of Natural History, New York. The length of this animal was estimated by Prof. Cope at 75 feet; its name was suggested by the hollow-chambered vertebrae of the back and neck. The *atlantosaurus*, of which the femur is over six feet long and two feet across at the head, was probably the same animal.

Camargue, La, la ka-màrg', France, an island in the department of Bouches-du-Rhône, formed at the mouth of the river by its two principal branches. It has an area of about 300 square miles. It is protected from the inundations of the river by dykes, and is mostly an unhealthy tract of pools and marshes, only a small portion of its being cultivated. Horses and cattle are raised on the island.

Camarilla, a word first used in Spain, but now in other countries also, to express the influence of certain persons in obstructing the operation of the official organs of government. When Ferdinand VII., in 1814, returned to Spain, he was surrounded by flatterers, who prevailed upon him to violate his promise of giving the people a constitution. They were called *camarilla* either from the room where they remained in waiting, or in allusion to the Council of Castille (*Camara de Castilla*). Until the revolution of 1820 the *camarilla* consisted mostly of men without talent, but passionately opposed to everything new; but when the king recovered his power in 1823 they became more influential and have since repeatedly interfered with the ministers. The thing itself is old enough; priests, favorites, and women have often formed *camarillas* in monarchies and other governments.

Camarina, ka-ma-rē'na, Sicily, an ancient town on the southern coast of the island, founded by a colony from Syracuse, about 600 B.C. Its first overthrow, which occurred 553 B.C., was the result of a revolt from the parent city. On its reduction it was razed to the ground, but was afterward rebuilt. It was in an exposed position in the Roman and Carthaginian wars, and was several times taken, retaken, and destroyed. Scarcely any vestiges of the ancient town remain.

Cam'arines, North and South, Philippines, two provinces in the southeastern part of the island of Luzon. The name is also applied more vaguely to the whole of the southeastern peninsula of the island. The Camarines provinces are bounded north by the province of Tayabas; south by the province of Albay, which forms the southern extremity of the peninsula; east by the Pacific Ocean; and west by the great Bay of Ragay. The formation of the peninsula is volcanic; the Caravallos range of mountains extends its whole length, from north to south, and seven of its peaks are active volcanoes. One of them, which is continually emitting smoke and flame, is well known to mariners coming from the east, and forms a kind of natural lighthouse. The most important product is rice. The soil of the two provinces possesses the same remarkable fertility which accompanies all the volcanic formations throughout the archipelago. Tobacco, sugar, coffee, cocoa, and indigo, are largely produced for ex-

portation; but the chief occupation of the inhabitants of the Camarines is the culture of the pineapple, and the manufacture of pina cloth (q.v.). The women of the Camarines are esteemed the most skillful embroiderers in Luzon of the delicate pina. The skill of the women of these provinces is also singularly displayed in the working of gold and silver filigree. All the artificers in precious metals are women; and some articles of jewelry, especially their neck chains, are very beautiful. The agriculture of the Camarines indicates in some respects a degree of progress beyond that of the other provinces of the island. The ox, and occasionally the horse, are used in plowing, instead of the slow, unwieldy buffalo, so generally preferred by the native East Indian farmer. The Camarinians have also discarded the primitive plow, formed from a single piece of crooked timber, with a point hardened by fire; and have substituted in its place a more modern style of implement. The provinces have well-constructed roads; and many of the rivers are traversed by substantial stone bridges. The Naga River, which drains the lakes Bato, Baao, Buhí, and Iryga, and empties into the Bay of San Miguel, is navigable about 40 miles for vessels drawing not more than 13 feet of water. The industrial development of these provinces has been accompanied by a notable increase in population; and this being composed, with but small exception, of the brown race of the Philippines, which has yielded so readily to the influences of Christian civilization. The Camarines have not had their progress retarded, like other provinces of Luzon, by the troublesome presence of the wild negro race.

Camass-rat, ka-nās-rāt, a pocket-rat of the northwestern United States, similar to the gopher (q.v.). Its chief food is the camass (*Camassia esculenta*).

Cambacérès, Jean Jacques Régis, zhōn zhāk rā-zhē kǎn-ba-sā-rās, Duke of Parma, French statesman: b. Montpellier, 18 Oct. 1753; d. Paris, 8 March 1824. His zeal and talents soon obtained him distinction, and the office of a counselor at the *cour des comptes* at Montpellier. At the beginning of the Revolution he received several public offices, became in September 1792 a member of the Convention, and labored in the committees, particularly in the committee of legislation. On 12 Dec. 1792 he was commissioned to inquire of Louis XVI. whom he desired for his counsel, and it was on his motion that the counsel was allowed to communicate freely with the king. In January 1793 he declared Louis guilty, but disputed the right of the Convention to judge him, and voted for his provisory arrest, and in case of a hostile invasion, death. On 24 January he was chosen secretary of the Convention. As a member of the Committee of Public Safety he reported, in the session of 26 March, the treason of Dumouriez. In August and October 1793 he presented his first plan for a civil code, in which his democratical notions were displayed. He was a member of the Council of the Five Hundred, where he presented a new plan for a code civil. This *Projet de Code Civil*, 1796, became subsequently the foundation of the Code Napoléon. On 20 May 1797 he left his seat in the council. A year afterward he appeared among the electors of Paris;

CAMBALUC — CAMBODIA

and after the revolution of the 30th Prairial, VII. (19 June 1799), was made minister of justice. On the 18th of Brumaire he was chosen second consul, and in that office made the administration of justice the chief object of his attention. After Napoleon had ascended the throne, Cambacérés was appointed arch-chancellor of the empire, and after obtaining many high distinctions, became in 1808 Duke of Parma. During the campaign against the allied powers in 1813, Cambacérés was made president of the council of regency. At the approach of the allies in 1814 he followed the government to Blois, and from that place sent his consent to the abdication of the emperor. When Napoleon returned in 1815 Cambacérés was again made arch-chancellor and minister of justice, and subsequently president of the Chamber of Peers. After the second fall of Napoleon he was banished, as a regicide, but in 1818 was permitted to return.

Cambaluc, kām-ba-look', the name by which the city we now know as Peking became known to Europe during the Middle Ages. It was the form given by Marco Polo (qv) to the Tartar word, *Khambalu*.

Cambay, kām-bā', British India, a seaport of Hindustan, Bombay presidency, the chief town of a native state of the same name, at the head of the Gulf of Cambay, 82 miles north-northwest of Surat. It was once a place of importance, but owing to the silting-up of the harbor, has greatly declined. The tides rush in with violence, and rising from 30 to 40 feet, enable the largest vessels to approach the shore; but again, at ebb, leave them dry. Among the buildings are several mosques and Hindu temples, and many religious structures of the Jains. The natives are expert jewelers and goldsmiths, and agate, carnelian, and onyx ornaments are exported. The trade is chiefly in cotton, ivory, and grain; the latter product being shipped to Bombay. Pop. 31,390. The state has an area of 350 square miles, and a population of 89,722.

Cambellite. See CRAPPIE.

Cambert, Robert, rō-bār kân-bār, French musician: b. Paris, about 1628; d. London, 1677. He founded the Royal Academy of Music, now the Paris Grand Opera. He was the first French opera composer, his works including 'La Pastorale' (1659), the first French opera; 'Pomone' (1671); 'Ariadne'; and 'Adonis.' For 22 years he was associated with the Abbe Perrin in the conduct of French opera, and going to England subsequently became "Master of the Music" to Charles II.

Cam'berwell, England, a parliamentary and municipal borough of London, on the south of the Thames, in Surrey, between Lambeth and Deptford. Its three divisions, North Camberwell, Peckham, and Dulwich, each return one member. Pop. (1901) 259,258. See LONDON.

Camberwell Beauty, the common English name of the *Vanessa antiopa*, a large and beautiful butterfly found in Great Britain, but much more common on the continent of Europe and in North America, where it is called Mourning Cloak (qv.). It measures three inches or more between the extremities of its extended wings, which are of a dark-brown color, with a broad light-yellow border, and a row of blue spots

near the edge. The caterpillar feeds on the leaves of the birch, willow, and poplar. When fully grown the caterpillar is black, with bright-red spots along the back, and small spines over the whole body.

Cambiaso, kām-bē-ā'sō, **Luca** (called LUCHETTO DA GENOVA), Italian painter: b. Moneglia, 1527; d. Madrid, 1585. His best works are the 'Martyrdom of St. George'; and the 'Rape of the Sabines.' Late in life, at the invitation of Philip II., he visited Madrid, and executed a fine composition, representing the 'Assemblage of the Blessed,' on the ceiling of the Escorial.

Cambier, kân-bē-ā, **Ernest**, Belgian explorer: b. Ath, 1844. He entered the army, serving as adjutant on the general's staff, and in 1877 went as geographer on the first expedition of the International African Association, under the leadership of Crespel. The latter died in Zanzibar in 1878, and Cambier became leader. Accompanied by Wauters and Dutrieux, he started for the interior from Bagamoyo, and after a difficult journey reached Unyamwezi; after the death of Wauters and Dutrieux's return to Europe, he went on to Karema on Lake Tanganyika. Here, in September 1879, he established the first post and scientific station of the association, and remained there till 1882. He published 'Rapports sur les Marches de la première Expédition de l'Association internationale.'

Cam'bium, in botany, the layer of delicate thin-walled cells separating the wood from the bast in a great many stems and in a cross section appearing as a ring. The growth of the stem takes place by the deposition on the outside of the wood, of new wood-layers formed from the cambium, and on the inside of the bast, of new layers of bast formed from the outer cells of the cambium layer. In conifers and dicotyledonous woody perennials the primary bundles are arranged in a circle, and their cambium layers are thus made to form a more or less continuous ring of cambium in the stem. By the deposition of new layers of wood and bast regularly taking place, especially in spring, at the inner and outer surfaces of this cambium-ring, the stem is caused to increase in thickness.

Cambles, a gluttonous king of Lydia, who is said to have eaten his own wife, and afterward killed himself for the act.

Cambo'dia, or **Camboja**, Indo-China, nominally a state under a French protectorate, but practically a French dependency, situated on the lower course of the Mekong, 220 miles from northeast to southwest, and 150 miles broad, comprising an area of 40,530 square miles. It is bounded on the southeast and south by French Cochinchina; on the southwest by the Gulf of Siam; on the north by Siam; on the east, toward Anam, where the frontier traversing imperfectly explored territories is vague, by the territories of independent Mois tribes. The coast, 156 miles long, indented about the middle by the Bay of Kompong-Som, offers but one port, Kampot. Among the numerous islands along the coast are Kong, Rong, Hon-Nan-Trung, etc., most of them inhabited. The principal river, the Mekong (in Cambodian, Tonlé-Tom, "Great River"), flows through Cambodia



M. JULES CAMBON.

CAMBODIA — CAMBRAI

from north to south, as far as Chen-Tel-Pho, and thence southwest till, at the town of Pnom-Penh, it divides into two arms, the Han-Giang, or Bassac, and the Tien-Giang, or Anterior River, both flowing south. Above Pnom-Penh is a north-northwest outlet for the surcharge of the Tonlé-Tom, the Tonlé-Sap ("Sweet Water River"), expanding into the Great Lake, 100 miles by 25 miles in area, with a depth of 65 feet at its maximum magnitude. The greater part of the country is low and well watered and heavily timbered. The climate presents a dry and a wet season (June to November) and is fairly healthy. The soil is very fertile, producing large quantities of rice, besides maize, sugarcane, cotton, betel, tobacco, indigo, coffee, etc. Timber is abundant. Gold and precious stones are found, besides iron, tin, and limestone. Cattle are exceedingly numerous. Among wild animals are the elephant, wild buffalo, deer, and tiger. The Cambodians were formerly a highly cultured and civilized race. Various architectural remains, witnessing to former greatness, are found throughout the country. The present population is very mixed. The religion is Buddhism. In early times Cambodia was a powerful state to which even the kings of Siam paid tribute, but it gradually fell into decay, until about the close of the 18th century the Siamese annexed part of Cambodia to their own land, and reduced the rest of the country to a state of dependency. France, on 11 Aug. 1863, concluded a treaty with the king of Cambodia, Nerodom, placing Cambodia under a French protectorate. This treaty was superseded by that of 17 June 1884, under which the king of Cambodia accepted all the reforms, administrative, judiciary, financial, and commercial, which the government of France might institute. The chief imports are salt, sugar, wine, and various manufactured goods, such as textiles, and arms; the exports include salt-fish, spices, cotton, tobacco, and rice. The capital is Pnom-Penh. Pop. 1,500,000.

Cambodia, or **Mekong**, a large river of southeastern Asia, which rises in Tibet, passes through Yunnan, a province of China, Laos, Anam, Cambodia, and French Cochinchina, and falls into the Chinese Sea by several mouths, after a course of about 2,600 miles. Its navigation is much interrupted by sand-banks, rapids, etc., at various points of its middle and upper course. The Tonlé-Sap ("Great Lake"), on the frontiers of Cambodia and Siam, is connected with the Mekong.

Cambon, Jules Martin, zhül mār-tān kǎn bôn, French diplomatist: b. Paris, 5 April, 1845. He studied for the law and fought in the Franco-Prussian war, reaching the grade of captain. Entering the civil service, he became prefect of Constantine in 1878, prefect of the Département du Nord in 1882, prefect of the Rhone in 1887, governor-general of Algeria in 1891, and ambassador to the United States in 1897. He represented Spain in drawing up the Spanish-American protocol in 1898.

Cambon, Pierre Joseph, pē ār zhō-zěf, French statesman: b. Montpellier, 17 June 1754; d. Brussels, 15 Feb. 1820. Engaged in commercial pursuits, he became interested in the Revolution, and on hearing of the flight of Louis XVI. he caused the republican government to be proclaimed in his native town. He was sent to

the legislative assembly, and while supporting the cause of democracy, gave particular attention to financial matters. Most of the great measures which enabled the government to get through the revolutionary period were suggested or controlled by him; and to him the honor is due of having laid the foundation of the modern financial system of France. He promoted the confiscation of the estates of the *émigrés* in 1792, and made, after 10 August, a report in which he argued that Louis XVI., having held a secret correspondence with the enemies of France, was guilty of high treason. He presided over the last sittings of the legislative assembly, and afterward took his seat as a member of the Convention. Here he opposed with equal energy the partisans of monarchy and of terrorism. When Louis XVI. was arraigned before the Convention, he voted for his immediate death, and against the appeal to the people. He opposed the creation of the revolutionary tribunal, and insisted upon trial by jury. At the opening of the Convention, he had been appointed member of the Committee on Finances; 7 April 1793 he entered the Committee of Public Safety. On 2 June, when the Girondists were threatened by the infuriated mob calling for their proscription, he boldly took his place among them, hoping to be able, through his name of the Committee on Public Safety, to save them from violence and arrest. The next year he made another report on the administration of finances, which is considered a masterpiece of financial ability, and gives a full sketch of the plan which was afterward adopted for the regular registration of public debt. In the conflict which brought on the revolution of the 9th Thermidor, Cambon took part against Robespierre and his adherents; but though he had been instrumental in their defeat, he was charged with having been their accomplice, and a warrant was issued against him. He succeeded in baffling the search for him, and on the amnesty proclaimed by the Convention on its adjournment, he retired to an estate in the vicinity of Montpellier, where he devoted himself to agriculture. In 1815 he was elected a member of the Chamber of Deputies. On the second return of the Bourbons, he was exiled as a regicide.

Cambon, Pierre Paul, pē ār pōl, French diplomatist: b. Paris, 20 Jan. 1843. He was graduated at the Ecole Polytechnique in 1863, and, after serving as secretary to Jules Ferry, became secretary of prefecture for the Alpes-Maritimes, prefect of the Aube, and French resident-general in Tunis. He was appointed ambassador to Spain in 1886, was transferred to Constantinople in 1890, and to London in 1898.

Cam'borne, England, a market town of Cornwall, 11 miles northwest of Falmouth, situated on the slope of a gently rising hill. There is a granite church in the Perpendicular style, restored in 1862, and several other places of worship. It also contains a market-hall, a mining-school, a working-man's institute, and a museum of mineralogy. Near it are tin and copper mines. Pop. (1901) 14,726.

Cambrai, kǎn-brā, or **Cambray**, France (Flemish, KAMBRYK), a fortified city on the Scheldt, in the department Nord, 45 miles south of Lille. From this place the linen cloth known by the name of cambric got its name. Cambrai

CAMBRIA — CAMBRIAN SYSTEM

is the seat of an archbishop. The Revolution stripped it of all its principal ornaments. The beautiful cathedral and the tomb of its archbishop, the celebrated Fénelon, were razed to the ground. There is a new monument to the memory of Fénelon in the present cathedral, a modern building of indifferent architecture. There is a large and handsome modern Hôtel de Ville, and an ancient belfry tower. Cambrai is the seat of a diocesan seminary, communal college, etc. It has a public library with 40,000 volumes and 1,400 MSS. Cambric and other linen goods, cotton, lace thread, leather goods, sugar, soap, beer, etc., are manufactured; and there is a trade in grain, oil-seed, hemp, etc. Cambrai is the Camaracum of the Romans. In 1508 the league against Venice was concluded at Cambrai between the Emperor Maximilian, Louis XII, the Pope, and Ferdinand of Aragon; in 1529 the peace with Charles V. Louis XIV. took Cambrai from the Spaniards in 1677, and it was finally confirmed to France by the Treaty of Nijmegen in 1678. Pop. 25,250.

Cam'bria, the Latin name of Wales, derived from Cymri, the name of the branch of the Celts to which the Welsh belong, and the name which they always give to themselves.

Cambrian Period, the name proposed by American geologists for the first or earliest time period of the Paleozoic era; in it were deposited the rocks of the Cambrian series. In Cambrian time animal life on the earth was already highly differentiated. All the great types of vertebrates were present then and definitely characterized. The principal types, so far as the fossil evidence goes, were Brachiopods and Trilobites, but many others existed, such as mollusks, marine worms, siliceous sponges, graptolites, and jellyfish, and by the end of the period starfish and crinoids. It is probable that plants, such as seaweeds, existed, but the evidence is very obscure. The climate during the Cambrian period was probably warm, even up to the Arctic Circle, but not torrid. This evenness of temperature may have been due to a much larger part of the earth's surface being covered by water than in later time, or to a difference in the composition of the atmosphere, more carbon dioxide being present.

At the beginning of Cambrian time the North American continent had already begun to take shape. A great land mass, which may have had lofty mountain ranges, extended from Labrador westward and northward, probably reaching as far south as St. Louis, and as far west as the Pacific coast. Its northern boundary is unknown, but probably was north of the Arctic Circle. To the south long narrow strips of land and narrow sounds occupied parts of Newfoundland, Nova Scotia, New Brunswick, and New England. A large Appalachian island, its west shore marked by what is now the Blue Ridge, extended from Vermont to Alabama; its eastern boundary is unknown, but was east of the present Atlantic coast-line. This Appalachian island was separated from the continental land mass to the west by a narrow sound. Southwest of the continent another long but narrow land mass, now the Sierra Nevada, extended from Puget Sound to Mexico, and another large island reached from the Kootenai district of British Columbia southward to Colorado. There were besides smaller islands in

Missouri and Texas. During Cambrian time the continental land mass slowly sank, and by the end of the Cambrian a great interior sea covered the whole Mississippi valley.

Cambrian System (from "Cambria," an ancient name for Wales), a term first used by Murchison and Sedgwick in describing the great series of slates and grits on the boundary between England and Wales, about 1835. Murchison, however, included the rocks in his Lower Silurian system, and the Cambrian was not generally recognized as a separate system until over 20 years later. The Cambrian system is fairly well defined at its base, since the rocks are deposited upon the upturned, eroded edges of Algonkian and Silurian strata, indicating a great time break. The top of the Cambrian grades into the Silurian. In North America the rocks of the Cambrian system are divided into three series, as follows: (1) the Lower Cambrian, or Georgian, containing *Olenellus* fossils; (2) the Middle Cambrian, or Acadian, with *Paradoxides* fauna; and (3) the Upper Cambrian, or Potsdam, with *Olenus* fauna. The Cambrian rocks were laid down along the shores of the great Algonkian continent that extended from Labrador to the Pacific Ocean, and as far south as St. Louis, in the narrow sounds that covered parts of Newfoundland, Nova Scotia, New Brunswick, and New England, and around the shores of the Appalachian and the Sierra Nevada uplifts. The rocks indicate generally a period of tranquil change, the ocean slowly advancing over the sinking continent and islands, just as one may see it to-day along great stretches of coast. The rocks are chiefly shallow water formations, including conglomerates, sandstones, and shales, though limestones, indicating deep water, are found in western Vermont, Nevada, and British Columbia. In a few places, as at South Mountain, Pa., there are rocks representing lava and volcanic ash interstratified with detrital sediments.

The Cambrian rocks undoubtedly cover a great area in North America, but are, over long stretches of country, buried beneath later sediments. The total thickness so far as known is not over 12,000 feet as a maximum, unless part of the underlying Algonkian be included. The Rhode Island Cambrian is 1,000 feet thick, the New Brunswick 2,500 feet, the Arizona 5,000 feet. The rocks are classified by Wolcott into these geographic provinces: (1) the Atlantic or eastern border, including the Nova Scotia basin, and the basin extending from southeast Newfoundland, across New Brunswick and Maine, into Massachusetts; (2) the Appalachian or eastern border province; (3) the Rocky Mountain or western border province; (4) the interior or continental province, including the region of the central and upper Mississippi and Missouri valleys, the Adirondacks of New York and Canada, and the deposits found in Dakota, Wyoming, Arizona, and Texas.

In Europe the Cambrian rocks are developed more fully than in North America; thus the conglomerate sandstones, shales, slates, and quartzites of the Welsh Cambrian are fully 20,000 feet thick. They are rocks indicating shallow-water conditions, and show three divisions. They extend from Wales, along Sweden, Norway, and Lapland into Russia, having in Sweden a thickness of 2,000 feet. To the east the Cambrian

CAMBRIC — CAMBRIDGE

formations thin out, and in central Russia die out altogether, the Ordovician resting directly on the Archæan. There are considerable areas of Cambrian in Germany, Bohemia, France, Portugal, and Spain; also in northeast China, in the Salt Range in India, in Australia, and in Argentina. See CAMBRIAN PERIOD.

'Report of the British Association' (Sedgwick 1835); Dana's 'Manual of Geology'; Geikie's 'Text-Book of Geology'; 'Bulletin 81 of the United States Geological Survey.'

Cambric, kām-brik, a fine, thin kind of linen cloth manufactured originally, it is said, at Cambrai (q.v.) in French Flanders, whence the name. Cambric is manufactured in the north of Ireland, in England, Switzerland, and France, and is now chiefly used for handkerchiefs. The name is also applied to a cotton fabric which is in reality a kind of muslin.

Cambridge, kām bridj, **Ada**, the pseudonym of **Mrs. George Frederick Cross**, English novelist: b. Saint Germans, Norfolk, England, 21 Nov. 1844. She was married in 1870 to Rev. G. F. Cross and went with him to Victoria in that year, since 1893 living near Melbourne. She is the author of 'My Guardian' (1877); 'In Two Years' Time' (1879); 'A Mere Chance' (1882); 'A Marked Man' (1891); 'The Three Miss Kings' (1891); 'Not All in Vain' (1892); 'A Little Minx' (1893); 'A Marriage Ceremony' (1894); 'Fidelis' (1895); 'A Humble Enterprise' (1896); 'At Midnight' (1897); 'Materfamilias' (1898); 'Path and Goal' (1900); 'The Devastators' (1901). She has also written several notable poems.

Cambridge, Adolphus Frederick (1ST DUKE OF): b. London, 25 Feb. 1774; d. 8 July 1850. He was the youngest son of George III., and the uncle of Queen Victoria. He entered the British army as ensign when 16 years of age, and completed his education at the German university of Göttingen. He leaned at first to the side of the opposition on the question of the French war, but afterward sided with the government. He took part in the campaign in the Netherlands (1793), and fell into the hands of the French at the battle of Hondschoote, but was soon afterward exchanged. In 1801-3 he was employed in Hanover, vainly endeavoring to preserve it from occupation by foreign powers. In 1816 he was again sent to Hanover by the British prince regent, in the capacity of governor-general, and in 1831 was appointed viceroy of Hanover. In 1837, on the separation of Hanover from the British crown, he returned to England again. From that period until his death he was best known to the public as the president of charitable societies, and the chairman at the anniversary dinners of public associations.

Cambridge, George William Frederick Charles (2D DUKE OF), English general, son of the preceding: b. Hanover, 26 March 1819. He became colonel in the army in 1837, and major-general in 1845. In 1850 he succeeded his father as Duke of Cambridge, in 1854 was advanced to the rank of lieutenant-general, and in 1856 to that of general. He commanded the two brigades of Highlanders and guards which formed the first division of the army sent to the Crimea. He led these troops into action at the battle of Alma, and at Inkerman had a horse shot under him. Di-

rected by his physician to withdraw for a time from camp life, he retired first to Pera, and soon after to England. On the resignation of Viscount Hardinge in 1856, he was appointed commander-in-chief of the British army. He retired in 1895.

Cambridge, England, an inland county bounded on the north by the county of Lincoln; on the west by Northampton, Huntingdon, and Bedford; on the south by Hertfordshire and Essex; and on the east by Suffolk and Norfolk. A great part of northern half of the county belongs to the fen district and is very flat, farther south it is undulating, and in the south-east some heights occur. The principal rivers are the Cam or Granta, and the Ouse, with the Nen in the north. An important portion of the county, including the Isle of Ely, belongs to the great artificially drained tract known as the Bedford Level (q.v.). About nine tenths of the total acreage of the county is now productive, and a greater proportion of land is under corn crops than in any other county in the kingdom. Potatoes, turnips, and mangold are the chief green crops. The southern portion of the county abounds in dairy farms, celebrated for the production of excellent butter and cheese. The part of the county extending from Gogmagog Hills to Newmarket is chiefly appropriated to sheep-walks. The chief mineral productions are the phosphatic nodules known as coprolites, lime, and clay for brick and tiles; and peat is cut for fuel. Cambridgeshire sends three members to the House of Commons. The Isle of Ely in some respects forms a separate county. Pop. (1901) 190,687.

Cambridge, England, a municipal and parliamentary borough, capital of Cambridgeshire, situated on the river Cam, 50 miles north of London. It is an ancient place, and was a Roman station. In 871 the Anglo-Saxon town was burned by the Danes, and again in 1010. A castle was erected here by William the Conqueror. Cambridge received some valuable privileges from Henry I. In the reign of Richard II., who held a parliament here, great disputes took place between the authorities of the town and university, which ended in the former losing many of their privileges, and the corporation was not fully restored until the reign of Henry VIII. In 1630 the plague raged here with great violence, so that the students were driven from the university. The greater part of Cambridge occupies a level area encompassed by the colleges and their beautiful grounds and gardens on both sides of the Cam, which is crossed by nine bridges. Several of the streets are narrow and winding, but others are spacious and airy, and much improvement has taken place of late years. The town possesses a guildhall, fine county hospital, free library, and one or two interesting old churches, especially St. Benedict's, with a tower in the Saxon style of architecture, and the round church of the Holy Sepulchre. It is the university, however, that gives Cambridge its importance, and the colleges and university buildings comprise many fine specimens of architecture. We may specify King's College, with its splendid chapel in the Perpendicular style, Trinity College (the largest in the university), Queen's College, Jesus College, St. John's College and chapel, Gonville and Caius College; the Fitz-

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william Museum, university library, senate house, divinity school, the Pitt Press, etc. The parish church of Great St. Mary's serves as the university church, and there is a handsome Roman Catholic church. A post-graduate Presbyterian college was opened in 1899. There is also a grammar-school. Cambridge is the birthplace of Jeremy Taylor, and of Richard Cumberland the dramatist. The town sends one member to Parliament. Pop. (1901) 38,393.

Cambridge, Mass., city and one of the county-seats of Middlesex County, situated on the Charles River and the Fitchburg railroad; opposite to and connected with Boston by nine bridges. It was founded in 1630-31, under the name of "Newe-Towne," or "Newtown," and did not receive its present name until several years later. In 1636 the General Court appropriated \$2,000 to locate a school in Old Cambridge, which later became Harvard College, now Harvard University. In 1631 Cambridge was 35 miles long and only one mile wide, including the townships now incorporated as Billerica, Bedford, Lexington, Arlington, Brighton, and Newton, all these having been gradually separated from it. The city was formerly divided into villages called Old Cambridge, Cambridgeport, East Cambridge, and North Cambridge, names which are still used to designate certain districts. It has grown into a populous manufacturing centre, where glass, furniture, organs, steam-engines, etc., are made, the value of which amounts annually to over \$35,000,000. Here also is located the massive stone court-house of Middlesex County. The first printing office in the United States was located in Cambridge, and the 'Bay Psalm-Book,' published by Stephen Day and printed in 1640, was the first book from this press. Cambridge has now extensive printing establishments, including the Riverside Press; the Athenæum Press, and the University Press. For historical and literary associations, Cambridge is one of the most famous cities in the United States. The venerable Washington elm, under which Washington took command of the American army, 3 July 1775, stands at the corner of Mason and Garden streets. "Craigie House," built by Col. John Vassall in 1759, was Washington's headquarters in 1775-6, and afterward became the home of the poet Henry W. Longfellow until his death. On Elm Avenue is "Elmwood," the birthplace and home of James Russell Lowell, who lived here 1819-91. A part of this place has been bought by public subscription, to be preserved as a public park. This city has been the home of such distinguished men as Oliver Wendell Holmes, William Henry Channing, Margaret Fuller Ossoli, Col. Thomas Wentworth Higginson, Louis Agassiz, John Fiske, and Charles Eliot Norton. The fine city hall and land for a park was the gift of a former citizen, Frederick H. Rindge, who also presented the city with a public library, an institution now called the Rindge Manual Training School, and other benefactions which amounted to more than \$1,000,000. The beautiful Mount Auburn cemetery is partly in Cambridge and partly in Watertown. Among important buildings are those of Harvard University; Radcliffe College; Cambridge Hospital; Manual Training School; the Latin and High Schools; Public Library; and Middlesex County Court-house. In recent

years much has been accomplished toward developing a system of parks which will eventually include nearly the entire river front. Pop. (1900) 91,886. Consult: Paige, 'History of Cambridge' (1877); Powell, 'Historic Towns of New England' (1898). See HARVARD UNIVERSITY.

Cambridge, Ohio, city and county-seat of Guernsey County, on the Baltimore & O. and the Pennsylvania R.R.'s, 55 miles north of Marietta. It is situated in a coal and iron region which has also deposits of pottery clay; and the industries are chiefly mining and manufactures connected with these resources. There is also natural gas used for heating. The city owns and operates its waterworks. Pop. (1900) 8,241.

Cambridge Manuscript. See BEZA'S CODEX.

Cambridge Platform, a system of church order and polity agreed on by a synod of New England churches, held at Cambridge, Mass., in 1648. It was a resolution rather than a decree, the platform itself denying the synod's authority to pronounce the latter; but was accepted by the Congregational churches as a correct presentation of New Testament principles, and therefore morally obligatory as a guide. Its chief positions were: The one true and immutable form of church government has been prescribed in God's word. Christ is the supreme head of his Church, which, since his advent, consists of distinct, equal, and self-governing bodies under him, not too large to meet conveniently in one place nor too small to carry on church work effectively. They are therefore monarchies as to him, democracies in themselves, and aristocracies as to each other; but obligated to mutual communion of care, counsel, monition, worship, succor, and transfer of members. Synods are useful, but not permanent, nor with authority for censure or discipline, but when their decisions accord with God's word they should be submitted to. Christ has deputed extraordinary but temporary power to his apostles, ordinary and permanent power to the churches. Officers are advantageous, but not indispensable, and each church may appoint and remove its own, but should consult its neighbor churches when feasible. These officers consist of bishops, pastors or elders (synonymous in function), and deacons who can act officially only in temporal matters. Ordination is the solemn installation of a church head into his place, following his election. The relation of civil magistrates to church affairs is also expounded.

Cambridge, University of, a famous university situated at Cambridge, England, the origin of which is involved in obscurity. Until the 12th century we find no annals of the university that can be trusted. Henry III., in 1231, issued writs for the regulation of Cambridge "clerks," and makes mention of a chancellor and masters. In 1334 Edward III. granted the university some important privileges; and in 1430 Pope Martin V. invested it with exclusive ecclesiastical and spiritual jurisdiction over its own scholars. In the reign of Elizabeth further privileges and rights were bestowed on it, and all preceding grants were confirmed. The university in its corporate capacity is referred to as consisting of the chancellor, masters, and scholars. The university buildings now consist

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of 17 colleges and one public hostel, the Fitzwilliam and other museums, university library, senate-house, laboratories, etc. The following list shows the names of the colleges, and the time when each was founded:

1. Saint Peter's College, or Peter House.....	1284
2. Clare College, formerly Clare Hall.....	1326
3. Pembroke College.....	1347
4. Gonville and Caius College.....	1348
5. Trinity Hall.....	1350
6. Corpus Christi College.....	1352
7. King's College.....	1441
8. Queen's College.....	1448
9. Saint Catharine's College, or Catharine Hall.....	1473
10. Jesus College.....	1496
11. Christ's College.....	1505
12. St. John's College.....	1511
13. Magdalene College.....	1519
14. Trinity College.....	1546
15. Emmanuel College.....	1584
16. Sydney Sussex College.....	1596
17. Downing College.....	1800

Each of these colleges (as also Selwyn College, the public hostel, founded in 1882) is a separate corporation, governed by laws and usages of its own, although subject to the paramount laws of the university. There are eight separate orders in the several colleges, which are:

1. The head, who is styled master in all the colleges except King's and Queen's, in the former of which he is styled provost, and in the latter president.

2. Fellows, who are graduates, and upon the foundation of the college to which they belong. They receive an annual allowance from the college funds, the average amount of which varies from about £150 to £250, the latter sum being latterly fixed as the maximum. The number of fellowships varies considerably at the different colleges, some having less than 12, and others from 50 to 60. The tenure of a fellowship is generally limited to six years; but it may be prolonged under certain conditions. The total number of fellowships is about 400.

3. Noblemen graduates, doctors in the several faculties, bachelors in divinity, masters of arts, masters of law, and masters of surgery, who are not upon the foundation.

4. Bachelors of arts, law, medicine, and surgery.

5. Fellow-commoners, who are generally the younger sons of the nobility, or young men of fortune, and have the privilege of dining at the Fellows' table.

6. Scholars who are elected by direct examination or otherwise from the most distinguished among the undergraduates. Like the Fellows they receive an annual allowance from the college funds, but it is not so large in amount, and the tenure is shorter.

7. Pensioners, who form the great body of the students.

8. Sizars, students of limited means, who receive various emoluments.

In addition to these there is a class of students called minor scholars or exhibitioners, who do not properly form a separate order, but are ranked along with the pensioners or general body of students. These also receive a certain annual allowance. The undergraduates (numbering 3,016 in 1899) reside either in rooms belonging to their respective colleges, or in lodgings approved by the university authorities, and under strict rules, at least so far as those *in statu pupillari* are concerned. Ex-

cept a certain number of non-collegiate students they all belong to some particular college. The head of each college and the foundation Fellows together form the governing body.

The university is composed of a chancellor, vice-chancellor, the masters or heads of colleges, fellows of colleges, and students, amounting in all (in 1899) to 13,413 members, and is incorporated as a society for the study of all the liberal arts and sciences. The present statutes, which are based upon the older ones given by Queen Elizabeth, were drawn up by the Universities' Commission appointed in 1877, and were approved by the queen in council in 1882. The government is administered by a chancellor, who is generally a nobleman; a high steward; a vice-chancellor, who is the head of some college; two proctors, who attend to the discipline of all persons *in statu pupillari*, read the "graces" or decrees of the senate, etc.; the assessor; moderators (who examine for mathematical degrees); a commissary; a public orator, etc. The senate, which is composed of all who have taken the degree of doctor or master, is the great legislative assembly of the university. The legislative propositions which are passed by this assembly are called "graces," and these possess generally the force of statutes, provided they are not inconsistent with the original statutes. In 1899 the number of members of the senate was 6,995. The council of the senate consists of the chancellor, vice-chancellor, four heads of colleges, four professors, and eight others members of the senate chosen by the resident members of the senate and examiners, whose names appear on the electoral roll published annually by the vice-chancellor. Every university grace must be approved by this council before it is offered to the senate.

There are three terms at this university, which are fixed by invariable rules. They are: Michaelmas, or October term, which lasts from 1 October to 19 December; Lent, or January term, which begins on 8 January and lasts till within a few days of Easter; and Easter, or midsummer term, beginning three weeks after the end of the Lent term, and ending on 24 June. Every student must have completed nine terms' residence during three fourths of each term before he can take the degree of B.A., LL.B., M.B., or B.C., for which, accordingly, a residence of three years is required. A bachelor of arts, law, or surgery may be admitted "inceptor" at any time after three years from the completion of his bachelor's degree, and inceptors in every year become complete masters by creation on commencement day, that is, the day on which the degrees conferred during the year are completed: it is the Tuesday immediately preceding the last day of the Easter term. Bachelors of arts may obtain "honors" in the departments of mathematics, classics, moral sciences, natural sciences, law, history, theology, Semitic languages, or Indian languages. The successful candidates in each of these departments are arranged in a tripos, that is, in three grades. In the mathematical tripos these three grades are called, respectively, wranglers, senior optimes, and junior optimes; in the other triposes they are called first, second, and third class. Other degrees conferred by the university are those of doctor and bachelor of divinity, doctor of law and of medicine, and doctor and bachelor of music; while, by the

new statutes, graduates of distinction in science or letters may be created doctor in science or in letters, respectively. Since the passing of the university test act (34 & 35 Vict. c. 26) any person may take any lay academic degree, or hold any lay academic or collegiate office without subscribing any formulary of faith. Purely honorary degrees may be conferred without residence or examination, or exercises, on privy councillors, bishops, noblemen, or the sons of noblemen, deans of cathedrals, and heads of colleges, or upon any persons of eminent station or conspicuous merit; but no one who has received a degree in this way is entitled to a vote in the senate unless he has resided three terms at the university. Women who have fulfilled the conditions of residence and standing which members of the university are required to fulfill may be admitted to the tripos examinations. Those who pass are placed in the published lists and receive certificates; but no degrees are conferred upon them. Two colleges (Girton and Newnham) have been established for women within the precincts of the university, and many of the university lectures are open to students of these colleges.

The annual income of the university is about £60,000, arising from various sources, including the produce of fees at matriculations, for degrees, etc., and the profits of the university press; and from a tax assessed upon the incomes of the colleges. The professors are paid, some from the university chest, and others from estates left for that purpose. There are about 40 professors in the various departments of literature and science. The arts, sciences, languages, etc., taught by the professors are anatomy, Anglo-Saxon, Arabic, archaeology, astronomy, botany, chemistry, civil law, divinity, fine arts, geology, geometry, Greek, Hebrew, international law, Latin, laws of England, mathematics, mechanism, medicine, mineralogy, modern history, moral philosophy, music, natural philosophy, physics, physiology, political economy, Sanskrit, zoology, etc. There is, besides, a body of university tutors, readers, lecturers, and demonstrators, who supplement the work of the professors. The botanic garden, on the southeast side of the town, occupies between three and four acres. The anatomical school contains a large collection of valuable preparations. On an eminence at the distance of a mile from the college walks, on the road to Madingley, stands the observatory, which cost £19,000. The university library contains more than 500,000 printed volumes, besides many valuable manuscripts (among them the *Codex Bezae*). The New Museums and laboratories for the study of the natural sciences are among the most complete in the country. The Cavendish Laboratory, especially, is admirably contrived and furnished for the pursuit of experimental physics. The school of mechanical science, fitted with elaborate apparatus, offers a complete training in various branches of engineering. The Fitzwilliam Museum contains a noble collection of books, paintings, drawings, statuary, etc. The university sends two members, elected by the senate, to Parliament. The vice-chancellor is the returning officer.

Cambronne, Pierre Jacques Etienne, pē-ār zhāk ā-tē-ën kân-brôn (COUNT OF), French general: b. Saint-Sebastien, near Nantes, 26

Dec. 1770; d. 5 March 1842. He served on the national guard in the Vendée in 1792; distinguished himself by the capture of a Russian battery at Zurich in 1799; and took part in the campaigns of 1806-13. He went to Elba with Napoleon, and returned with him in 1815. Napoleon made him general and gave him the rank of count. At the battle of Waterloo he commanded a division of the Old Guard, and is credited with having made the famous reply to the demand for surrender, *La garde meurt et ne se rend pas* ("The guard dies, but never surrenders"). It is now certain, however, that he did not say this, but gave himself up as a prisoner to Gen. Halkett, and was taken to England. At the time of the restoration of the Bourbons, he was on the list of proscriptions, but was exonerated by two court-martials, and in 1820 appointed commandant of Lille by Louis XVIII.

Cambuscan', a prince of Cambaluc (Peking), whose name is a corruption of Genghis Khan, while the description applies apparently to his grandson, Kublai Khan. This was Milton's form of the Cambynskan of Chaucer's fragment of a metrical romance, 'The Squieres Tale.' Spenser continues and finishes the tale in his 'Faerie Queen' (IV., ii. and iii.); and John Lane, a friend of Milton's father, also wrote a continuation. Some of the romantic elements in it are widespread in Oriental story, occurring in the 'Arabian Nights,' the 'Panchatantra,' and elsewhere.

Cambyses (kām-bī-sēz) I., Persian king. His historical character is involved in great doubt, but he is commonly identified as the son and successor of Teispes, and father of Cyrus the Great (q.v.).

Cambyses II., king of the Medes and Persians: d. 522 B.C. He was the son of Cyrus the Great, and grandson of Cambyses I., and became, after the death of his father, king of the Medes and Persians, 529 B.C. In the fifth year of his reign he invaded Egypt, killed King Psammenitus, plundered Memphis, and conquered the whole kingdom within six months. He now wished to send a fleet against Carthage, to conquer Ethiopia, and to obtain possession of the temple of Jupiter Ammon. The first of these expeditions, however, did not take place, because the fleet, which was manned with Phœnicians, refused obedience to him. The army which was sent against the Ammonites perished in the desert; and the troops, at whose head he himself had set out against the Ethiopians, were compelled by hunger to retreat. From this time he gave himself up to the greatest cruelties. On his entrance into Memphis, seeing the Egyptians engaged in the celebration of a feast in honor of their god Apis, whom they had found, he believed that they were rejoicing at his misfortunes. He caused the holy bull to be brought before him, slew him with his own sword, and caused the priest to be scourged with rods. To drown his remorse he indulged in wine. No relation was held sacred by him when intoxicated. He caused his brother Smerdis, a dream concerning whom had disturbed him, to be murdered. His sister and wife Atossa, who lamented the death of Smerdis, he killed with a blow of his foot. These and other acts, almost indicating insanity, had irritated his subjects. A magian

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availed himself of this discontent, and obtained possession of the throne under the name of Smerdis, whose death had been concealed. Cambyzes had resolved to go to Susa, in order to punish him, when, according to the account of Herodotus, as he was mounting his horse, he received a wound in the hip from his sword, in consequence of which, he soon died, at Ecbatana, Syria, leaving no children. Somewhat different accounts are given by Ctesias and others.

Cam'den, Charles Pratt (1ST EARL OF), English statesman: b. 1713; d. London, 18 April 1794. After studying at Eton and King's College, Cambridge, he entered as a student at Lincoln's Inn, and in due time was called to the bar. In 1754 he was chosen member of Parliament for the borough of Downton. After acquiring great reputation as an advocate, he was, in 1757, appointed attorney-general, having the same year been elected recorder of the city of Bath. While he held the office of chief justice of the common pleas Wilkes was arrested on a general warrant as the author of the 'North Briton.' He was committed to the tower as a state prisoner; and being brought, in obedience to a writ of habeas corpus, before the court of common pleas, Chief Justice Pratt discharged him from his confinement on 6 May 1763. The behavior of the judge on this occasion, and in the consequent judicial proceedings between the printers of the 'North Briton' and the messengers of the House of Commons, and other agents of the ministry, was so acceptable to the metropolis that the city of London presented him with the freedom of the corporation, in a gold box, and requested to have his picture. In July 1765 he was raised to the peerage, by the title of Baron Camden; and about a year after made lord chancellor. In this capacity he presided at the decision of a suit against the messengers who arrested Mr. Wilkes, when he made a speech, in which he stated that "it was the unanimous opinion of the court, that general warrants, except in cases of high treason, were illegal, oppressive, and unwarrantable." On his opposing the taxation of the American colonies, he was deprived of the seals in 1770. He came into office again as president of the council, under the administration of the Marquis of Rockingham, in March 1782; on whose death, he resigned the following year. He soon after, however, resumed his place under Mr. Pitt, and, in 1786 was made Earl Camden. His popularity was very great in the American colonies, as is shown by the many counties, towns, and villages named in his honor.

Camden, William, English antiquary and historian: b. London, 2 May 1551; d. Chiselhurst, Kent, 9 Nov. 1623. He received part of his education at Christ's Hospital and St. Paul's School, after which he studied at Oxford, and in 1575 was appointed second master of Westminster School. He devoted himself faithfully to the duties of his situation, employing all his leisure in his favorite study of British antiquities. At this time he began to make collections for his great work, the 'Britannia.' In 1582 he traveled through the eastern and northern parts of England, to survey the country. The result of his researches appeared in 1586, when the first edition of his 'Britannia' was published

in Latin. This work, though at first necessarily imperfect, procured the author high reputation at home and abroad. In 1589 and 1590 he went into Wales and the west of England, and obtained materials for the improvement of his book, of which the fourth edition (1594) was enlarged to a quarto volume. In 1593 he became head master of Westminster, for the use of which seminary he drew up a Greek grammar (1597). The same year he obtained the office of Clarendieux king-at-arms, which left him at leisure to cultivate his favorite branches of knowledge. In 1600 appeared the fifth edition of the 'Britannia,' and in 1605 was published 'Remains of a Greater Work Concerning Britain'; and in 1607 a 'Narrative of the Conspiracy Called the Gunpowder Plot,' written in Latin, by the king's command. The same year Camden published the last edition of the 'Britannia' printed during his life, from which was made the English translation of Philemon Holland. After this he undertook to write the history of the reign of Queen Elizabeth, the principal literary labor of his future years. The first part of this work appeared in 1615, entitled 'Annales Rerum Anglicarum et Hibernicarum regnante Elizabetha, ad annum salutis' (1589). The second part was finished in 1617, but not printed till after the death of the author. In 1622 Camden founded a professorship of history at Oxford, which he endowed with the valuable manor of Bexley in Kent. He died at Chiselhurst in Kent, where he had spent the latter part of his life, and was buried in Westminster Abbey. His Chiselhurst home was the residence of Napoleon III. 1871-3. Besides the works already mentioned, Camden published a collection of early English historians, printed at Frankfort in 1603, folio. Hume, in his 'History of England,' ranks Camden's 'History of Queen Elizabeth' among the best historical productions which had been composed by any Englishman. Of the 'Britannia,' which has for three centuries been considered as a standard work, it is unnecessary to say more than that, as subsequently enlarged in Richard Gough's English edition of 1806, so as to extend to four volumes in folio, it constitutes a valuable treasury of British topography and antiquities. The Camden Society, which was established in London in 1838, and has issued a number of valuable works, was named in honor of William Camden. Its publications began in 1847, the first series including 104 volumes. The second series up to 1900 included 63 volumes.

Camden, N. J. city, port of entry, and county-seat of Camden County; on the Delaware River, opposite Philadelphia, with which it is connected by several ferries. The city is situated on a level plain and the streets cross one another at right angles. It is noted for its immense market gardens and manufactures, and is the site of several large ship-building concerns. Area five square miles.

Business Interests.—According to the Federal census of 1900 Camden had 817 manufacturing establishments, employing \$16,430,611 capital and 9,677 persons; paying \$4,540,032 for wages and \$11,499,151 for materials; and having an aggregate output valued at \$20,451,874. The most important industries were carpentry, foundry and machine-shop products, ship-building, worsted goods, oil cloth, boots and

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shoes, masonry, and textile fabrics. There were three national banks in 1899 with a combined capital of \$560,000 and surplus of \$315,000, and several private banking houses. The assessed valuation in 1900 exceeded \$16,000,000, and the tax rate was \$22 per \$1,000.

Public Interests.—In 1899 the city had 120 miles of streets, of which 55 miles were paved, 46 miles of sewers, 110 miles of water mains; and oil, gas, and electric street lighting and waterworks plants, the latter owned by the city. The notable buildings are the city hall, county buildings, and the hospitals and churches. At the close of the school year 1898-9 there were 21 public school buildings, 11,941 pupils, 241 teachers, and a public and a private high school.

History.—The city was chartered in 1828, and became an important commercial and business centre with the incorporation of the Camden & A. R.R. in 1833. Pop. (1890) 58,313; (1900) 75,935.

Camden, Battle of, a battle fought near Camden, 16 Aug. 1780, between the American troops under Gates and the British under Lord Rawdon. Shortly after the British captured Charleston in May, all South Carolina was in their hands except for the guerrilla warfare of Marion, Sumter, and others. Washington had already sent Kalb (q.v.) with 1,400 Maryland and Delaware regulars, among the best troops in the army, to save it, but the new disaster called for fresh efforts and a first-rate new commander of the Southern Department to succeed Lincoln. Washington wished to send Greene; but a popular clamor for Gates, mistakenly credited with the victory over Burgoyne, led Congress to give him the post. He took command at Hillsborough, N. C., where Kalb was vainly waiting for Gen. Caswell and the North Carolina militia to come up from South Carolina. Gates, therefore, determined to march south and join Caswell, and thus reinforced, seize Camden on the Wateree, near which was their camp—the strategic centre of the State, and the converging point of the chief northern roads. It was held by Lord Rawdon with a comparatively small force. A fortnight's starving march of 150 miles, in the course of which he picked up a company of Virginia regulars and the North Carolina men, brought him in front of Rawdon, strongly posted across the road 15 miles northeast of Camden. He might either attack with superior forces or hold Rawdon with a part while he sent the rest around his flank to seize Camden in the rear; but he did neither, and, after waiting two days without apparent object, moved west to Clermont, or Rugely's Mill, a strong position, 13 miles north of Camden. Here he was joined by 700 Virginia militia, but sent off 400 of his splendid Maryland regulars to help Sumter cut the British communications far to the southeast, and Cornwallis joined Rawdon, giving the British 2,000 trained men. Gates had no intelligence department, and supposed he still had only Rawdon's small force before him; and about 10 P.M. of 15 August started down the road to surprise Rawdon, Cornwallis at the same hour starting north to surprise him. The vanguards met about 3 A.M. a few miles above Camden, and the Americans were routed; but some British prisoners informed Gates that Cornwallis was in front with 3,000 men. Gates had 3,052,

most of his nominal force being on paper or helpless with dysentery; and over half of them were militia who had never been under fire and did not even understand using a bayonet. Kalb, the brave but judicious officer, wished to fall back on Rugely's Mill; but the other officers thought it too late to retreat, and Gates deployed his men, with as bad judgment as the decision to fight at all. The road ran through a level field flanked by swamps, so that everything depended on the firmness of the front rank; but he massed all the regulars on one wing and all the militia on the other. Kalb held the right opposite Rawdon, with the Delaware regiment and the 2d Maryland brigade in front, the 1st Maryland in reserve; the left wing had the Virginia militia in front and the North Carolina troops in the rear, opposed to Col. James Webster, with the Tarleton's cavalry in reserve. Gates' tactics were as ill-judged as his arrangement; he ordered the first charge made by the Virginia men, who did not even know how to march in order. They became tangled, and, while trying to reform, Webster's onrush broke them in wild panic; they threw down their loaded guns with bayonets set, without firing a shot, and ran to the rear. One regiment of North Carolina men fired several volleys, but all the rest fled like their neighbors, and the one exception soon shared their flight. Meantime, the 2d Maryland twice drove back Rawdon, then broke his ranks with a bayonet charge, and held the field. But Webster and Tarleton, following the routed mob, had flanked the 1st Maryland and after an obstinate fight crowded it off the field; and, taking the 2d Maryland in the rear, compelled it, too, to retire, after a fierce resistance. Kalb fought to the last, and was mortally wounded and captured, with eleven wounds. The stubborn fight of the regulars is shown by the fact that the Delaware troops were nearly annihilated, and the Maryland regiments lost nearly half their number. There were about 1,000 killed and wounded, and as many prisoners taken, with seven cannon and 2,000 muskets. The British lost 324. For the time the American cause in the South was at an end. Gates escaped to Hillsborough, but was shortly supplanted by Greene, who wrought a wonderful transformation in a few months.

Camden Society. See CAMDEN, WILLIAM.

Camden Town, England, a district of London in the parish of St. Pancras, and county of Middlesex. It takes its name from the Earl of Camden who acquired property here by marriage. The houses, which are in general of recent erection, are regular and substantial buildings. It lies northeast of Regent's Park and north of the Euston station of the London & N.W. R.R.

Camel, a large ruminant of the genus *Camelus*, family *Camelidae* (q.v.), two species of which have been domesticated since prehistoric times, and used as riding-animals and beasts of burden in the desert regions of the Old World. They differ from other ruminating animals in the presence of incisor teeth in the upper jaw, and canine teeth in both jaws; other differences are found in the feet, which have two elongated toes tipped with small hoofs, the feet resting upon fleshy pads beneath and uniting the toes. Although much search has been made, no wild species of camel can be found except one small

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two-humped variety, discovered by Prejevalski, which inhabits central Asia, northward to Siberia, in respect to which it is not certain that it represents an original wild species, or whether, on the contrary, it is not a degenerate race long ago escaped from domestication.

The Arabian camel (*Camelus dromedarius*) has one hump on the shoulders; the Bactrian camel (*C. bactrianus*) two. These are composed of muscle, flesh, and fat, which in times of famine is re-absorbed to a large extent. After it has been exhausted, a rest of three or four months, with abundance of food, is necessary to restore it. The former is the more common species, and is used from Mongolia and northwest India throughout south-central Asia, Asia Minor, Arabia, and northern and eastern Africa, and to a small extent in Spain and elsewhere. At the time of the rush of gold-seekers to California about 1850, efforts were made to naturalize them in the arid regions of the southwestern United States, as a means of carrying supplies to the army posts there, but they proved unsuccessful. The camels were allowed to run loose, and those that survived the mountain lions, Indians, and sportsmen, are still found in small numbers throughout Arizona and Sonora.

The original home of the single-humped camel is uncertain, but as it is better adapted to a sandy region than is the Bactrian species, it is thought to have originated in the Sahara or Arabian desert. Its peculiar adaptability to life in sandy regions is noticeable in many ways. The callous cushions (pads) on its feet are repeated upon the chest and the joints of the legs, upon which it rests when rising, kneeling, or lying down, and protect these parts from abrasion by the sharp sand. Its wedge-shaped, cutting teeth are well fitted for cropping the short, shrubby plants of the desert. Its long eyelashes protect it from the glaring sun and from the drifting sand; and the ability to close the oblique nostrils at will prevents the entrance of dust. The most remarkable provision for life in arid regions, however, is found in the structure of the stomach, the interior of which has no villi on its surface. Both the compartments of the paunch contain a number of pouches or cells in their walls, each of which may be closed and separated from the remainder of the paunch. These are filled and closed when the camel drinks, and by these means it can store more water than is requisite for its immediate use, and so save up a store which may gradually be drawn upon during long journeys over waterless districts. The camel's senses of sight and smell are very acute, and it is capable of discerning water at a great distance. By reason of these qualities it has been a most important factor in the colonizing of the countries that lie south and east of the Mediterranean, Black, and Caspian seas, and such oases or fertile areas as are separated by desert wastes.

The Bactrian camel is of smaller size and heavier build, and, by its harder and more cloven feet, and longer and finer hair, is better adapted to a rocky and cooler region. Its habitat is central Asia. Like the southern species it has wonderful endurance, withstanding the terrific summer heat of Persia and the Tibetan plains, and the Arctic cold of the passes of Hindu-Kush and Mongolia. They have been successfully employed as army transports by the English in northwestern India; and for many years,

through all weathers, trains of these camels, sometimes of many thousands, were the only means by which tea and other merchandise was transported between China and Russia.

There are many breeds of camel, exhibiting great diversity. Some are those bred only for the saddle, others as baggage-carriers or draft animals. Properly, a "dromedary" is any camel of either species of a saddle-breed, distinguished for its speed and ease of gait. As a beast of burden the camel has great powers of endurance. The Arabian species carries twice the load of a mule, while it is not unusual for the Bactrian species to carry half a ton weight upon its back; by reason of which it is sometimes poetically termed the "ship of the desert." Caravans frequently contain as many as 1,000 camels, which move along at a steady and uniform pace of about two and a half miles an hour. When bred especially for the purpose they have been known to carry a traveler 100 miles a day. They move with a pacing motion, lifting the feet on the same side successively. Their money value is about the same as that of horses of similar grade and purpose.

Camel, a water-tight box or caisson used to raise a sunken vessel, or to float a vessel over a shoal or bar. It is sunk by the admission of water, and is attached to the vessel, after which the water is pumped out, and the camel, rising by its buoyancy, lifts the load.

Camel-bird, a book-name of the ostrich (q.v.).

Camel-cricket. See MANTIS.

Cam'elford, England, a village, formerly a parliamentary borough of Cornwall, on the Camel, 28 miles northwest of Plymouth. The streets are spacious and well paved, but the houses are in general very indifferent. It has a town-hall, erected by the Duke of Bedford. Four miles to the northwest of Camelford are the ruins of King Arthur's castle of Tintagel, and about two miles to the north are the celebrated slate quarries of Delabole. The inhabitants are chiefly engaged in agriculture. It was disfranchised by the Reform Act of 1832. Previous to that period it sent two members to the House of Commons, and had done so from the time of Edward VI.

Camelidæ, the camel family, a highly interesting branch of the ruminants, including the Old World camels and New World llamas and guanacos, as the existing remainder of a divergent group formerly closely connected both in structure and in geographical distribution. It forms a distinct section of the *Ruminantia* named *Tylopoda*, in reference to the character of the feet, in which only the third and fourth toes are developed (no traces of any others being present), and these are embedded in a cutaneous pad, forming a broad elastic sole to the foot. The two metapodial or "cannon" bones of each of the long limbs are united for the greater part of their length, though separated for a considerable distance at the lower end. Their distal, articular surfaces, instead of being pulley-like, with deep ridges and grooves, as in other recent split-hoofed animals (*Artiodactyla*), are simple, rounded, and smooth. The toes terminate in small nails, and the weight of the animal rests upon the padded sole of the foot, instead of on hoofs, in adaptation to the soft

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sandy soil of the deserts, in which this race of animals seem to have lived ever since its origin. The dentition of the prolonged jaws has certain peculiarities. The full number of incisors are present in youth, but in the upper jaw these disappear, except the outermost, which persist through life. Canines are present in both jaws, those in the lower jaw being nearly erect and pointed, whereas the incisors in that jaw are procumbent. The molars are of the selenodont type, and one or more of the anterior premolars are usually detached from the series and of a simple pointed form. The neck is very long and flexuous, and its vertebræ have certain peculiarities. The shoulders are high, and the hind quarters inclined to droop. The hinder part of the body, indeed, is much contracted, and the thigh bone is long, and vertically placed, so that the knee-joint is lower in position, and the thigh bone altogether more detached from the abdomen than in most quadrupeds. The tail is well developed and the skin is clothed with long shaggy hair, capable of being woven. The nostrils are high, and may be closed against the admission of dust; and the lips are prolonged and flexible. There are no horns or antlers in either sex. The interior anatomy is peculiar, principally in the character of the digestive organs, described in the article CAMEL. The family includes the camels, of the genus *Camelus*, with two species, which are confined at present to the Old World (see CAMEL) and the genus *Llama*—with two species that are restricted to the New World. See ALPACA; GUANACO; LLAMA; VICUÑA.

Camelidæ, Fossil. The evolution of the camel (q.v.) through the Tertiary and Quaternary periods is nearly as completely known as that of the horse, and is hardly less instructive. The camels now inhabit central Asia and northern Africa, the llamas, South America. No fossil camels or llamas are found in these countries in deposits much older than the Quaternary. But in the Tertiary strata of North America have been found a series of animals which appear to be the direct ancestors of this family, and connect them with the primitive hoofed animals of the earliest Eocene. The earliest member of this series, ancestral probably to the camels among other ruminants, is *Trigonolestes* of the Lower Eocene, smaller than a cotton-tail rabbit, with the complete series of incisor, premolar, and molar teeth, the molars of the primitive bunodont type (see BUNODONT) and four complete toes, the side toes very slender (one toe of the primitive five had already been lost), and the metapodials all separate. In the Upper Eocene stage, *Protylopus*, as large as a jack-rabbit, the molars have become selenodont (q.v.), as in modern camels, but with shorter crowns, and the side toes are represented only by splints. In the Oligocene stage, *Poëbrotherium*, as large as a gazelle, the molars have longer crowns, the splints are reduced to small nodules of bone, and the metapodials, though still separate, are closely appressed. In the Miocene stage (*Procamelus*, etc.) the metapodials are sometimes separate, sometimes united; the incisors and premolars are generally reduced in size, and the anterior ones often lost; and the form of the teeth and skull comes closer to the modern type. The Pliocene camels (*Planchemia*, etc.) are still closer to the

modern type, all with united metapodials and reduced incisors and premolars, and at this epoch they spread to South America and the Old World, the gradual rising of the continents having made land connections between them about this time. During the Pleistocene epoch the camels all became extinct in their original home, although they still survive in the alien continents to which they had wandered.

The most remarkable peculiarity of the camels is the adaptation of the stomach, which enables the animal to go a long time without water (see CAMEL); palæontology gives no direct evidence of the evolution of this character. But the cushioned foot, equally an adaptation to desert life, is not indicated (by the form of the toe bones) in any ancestral camel previous to the Miocene, from which time it became gradually more marked. We may suppose, therefore, that the earlier ancestors of the camel were antelope- or deer-like in their habitat, and were gradually adapted to desert life.

Besides the main line of descent there were, especially in the Miocene, side branches now extinct, one of which (*Alticamelus*) was singularly giraffe-like in proportions, although not related to the giraffes, which were evolved in the Old World at the same epoch.

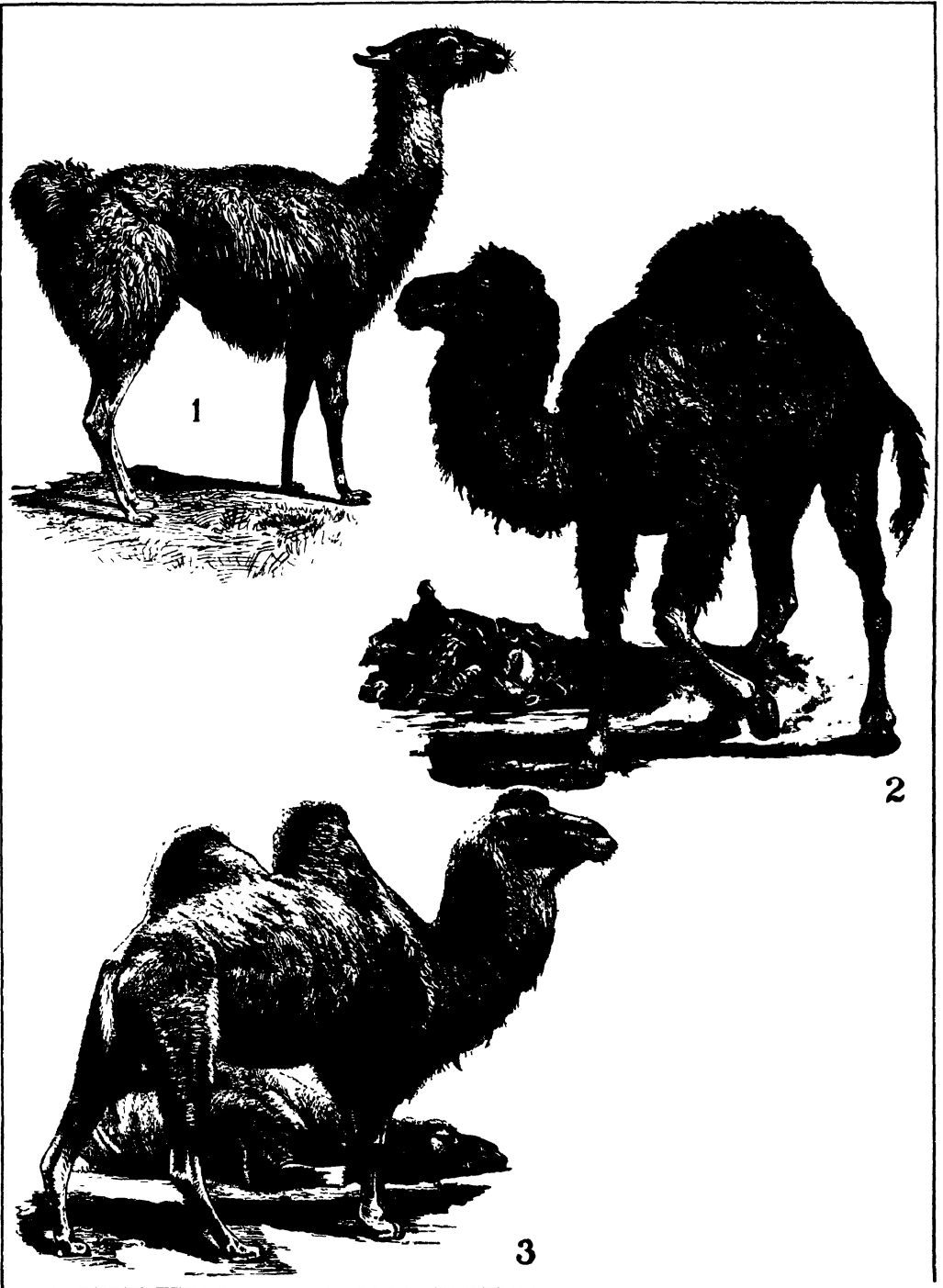
It is a general law in the evolution of any race of animals that at each succeeding stage in its development the progressive characters appear at an earlier period in the lifetime of the individual. The young individuals of one stage resemble the adults of the preceding stage, while the old individuals take on some of the characters of that next succeeding. This is well illustrated in the camels, especially of the Miocene epoch; in young individuals the metapodials are always separate, as they are in all adult camels of the Oligocene, and they are usually not completely consolidated until a comparatively advanced age. In modern camels and llamas they are consolidated before birth. The anterior incisors and premolars usually drop out in old individuals of Miocene camels; in the later stages they are minute stumps or scales which disappear early in life.

W. D. MATTHEW.

Camelina Sativa, căm-e-li'na sa-ti'va ("gold of pleasure"), a cruciferous annual, belonging to the order *Brassicaceæ*, frequently found in cultivated fields, especially among flax, where it has long been cultivated for its seeds, which contain much oil, sweet and edible when fresh, but apt to become rancid.

Camellia, ka-měl'ya, a genus of plants belonging to the natural order *Ternstramiaceæ*, an order which includes the tea-plant and several species of beautiful flowering shrubs, all natives of China. The name *Camellia* was given to this genus by Linnaeus in honor of Kamel or Camellus, a Moravian Jesuit. The *Camellia japonica*, as it grows in the woods and gardens of Japan and China, is a lofty tree of beautiful proportions, and clothed with a deep green shining foliage, with large, elegant flowers, either single or double, and of a red or pure white color. There are numerous varieties of this species in China, the greater part of which have found their way to Europe and America, while other new varieties have been produced. The double-white, double-striped, and double-warat-h, the last so called from the central petals

CAMELIDAE

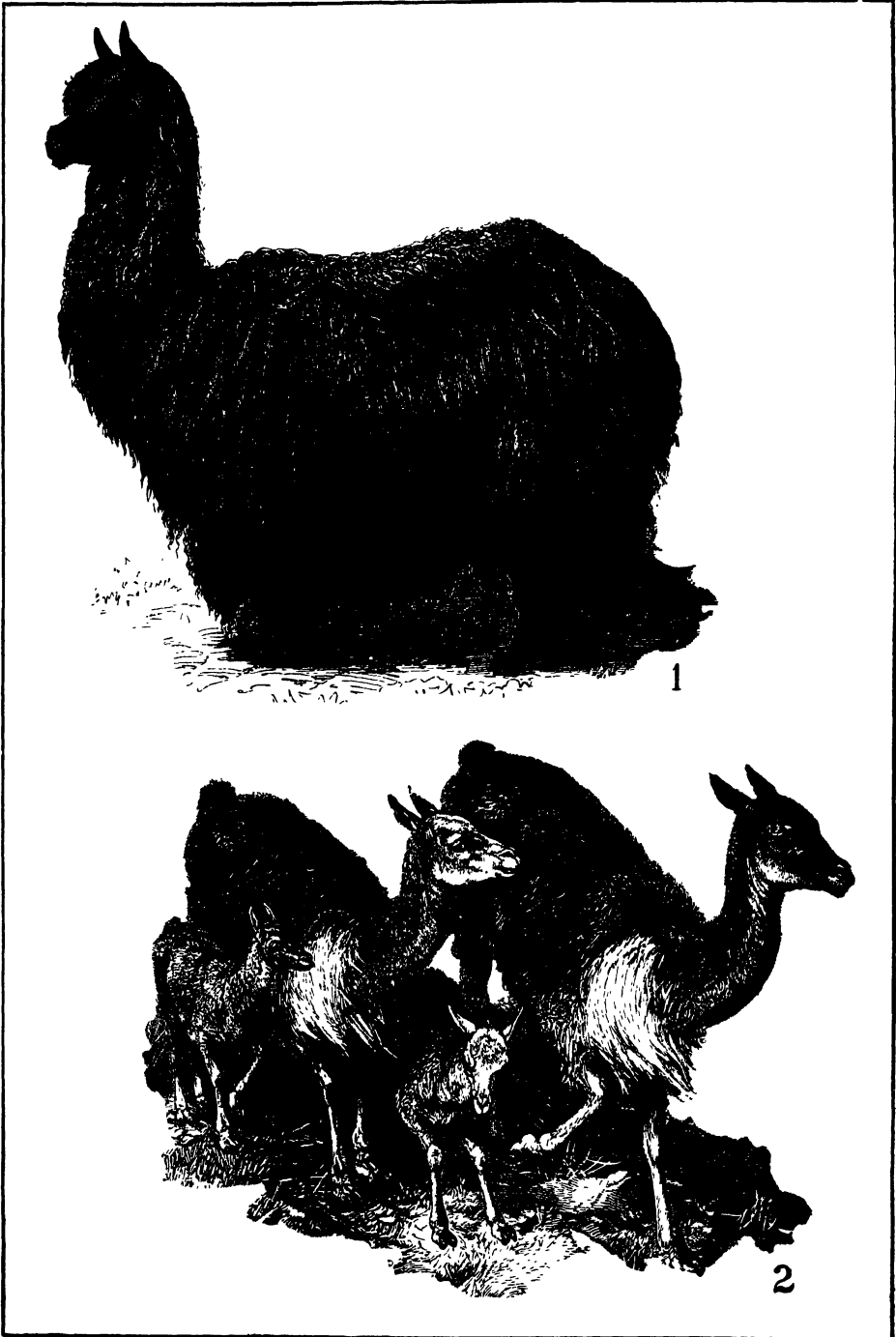


1. Guanaco.

2. Dromedary

3. Two-Humped Camel.

CAMELIDAE



1. Alpaca.

2. Vicuna.

CAMELOPARD — CAMERA LUCIDA

resembling those of the waratah plant of Australia, are considered the finest varieties, and both grow and flower well. The peony-flowered and fringed are also much admired. The oil-bearing camellia (*C. oleifera*) is cultivated for its seeds, from which an oil is expressed that is very generally used by the Chinese in their cookery. It thrives best in a red sandy soil, and attains a height of six to eight feet, producing a profusion of white blossoms and seeds. Besides these species the *C. reticulata* and *C. sasanqua* are cultivated.

The single red camellia is propagated by cuttings, layers, and seeds. It forms suitable stocks, on which the others are either inarched or budded and engrafted. The cuttings to be selected are the ripened shoots of the preceding summer; these are taken off in August, being cut smoothly at a joint or bud; two or three of the lower leaves are taken off, and the cuttings then planted firmly in the soil with a dibble. Inarching or engrafting is performed early in spring, when the plants begin to grow. A few seeds are sometimes obtained from the single red and semi-double camellias, and from the single waratah. These require two years to come up, but make the best stocks of any.

Camelopard. See GIRAFFE.

Camelopardalis, one of the northern circumpolar constellations added by Hevelius in 1690. It is a large, irregularly shaped constellation, something like the animal, and is more than 40° in length, with its head close to the North Pole. It borders upon Ursa Minor, Draco, Ursa Major, Lynx, Auriga, Perseus, Cassiopeia, and Cepheus. It contains no stars brighter than the fourth magnitude, and was put in to fill up a part of the sky otherwise uncovered by constellations. Being introduced later than Bayer's time, it has no letters except α , β , and γ , which Bailly introduced into the "B. A. C." in 1845. While these have not been universally accepted by astronomers, they will probably be adopted in a general revision of the northern constellations.

Cam'elot, in the Arthurian legends, the city where King Arthur's palace with the Round Table was located. Tennyson, in 'The Coming of Arthur,' describes the city and the royal court, and mentions it in others of the 'Idylls of the King' and in 'The Lady of Shalott.' It is also referred to by Shakespeare in 'King Lear.' The site of Camelot has been much in dispute; Shakespeare supposed it to be in Somersetshire; Tennyson and Capell located it at or near Winchester; and Caxton placed it in Wales.

Camel's Hump, one of the peaks of the Green Mountains, in Vermont, 17 miles west of Montpelier. Its height is about 4,100 feet.

Cam'el's-thorn, a genus of plants belonging to the natural order *Leguminosæ*, and the suborder *Papilionacæ*. They are herbaceous or half-shrubby plants, with simple leaves, minute stipules, axillary peduncles terminating in spines, and red flowers arranged in racemes. Only three species of this genus are known, the *Alhagi camelorum*, *A. nivalensis* and *A. mauro-rum*. They grow in the deserts of Egypt and the East, and their common name is derived from the fact that they afford a food much relished by camels. The first two species (if not

the third) yield a gummy, saccharine exudation like manna.

Cam'eo, in the proper sense, a gem engraved in relief, opposed to intaglio, in which the figure is sunk in the surface. The ancients generally used the onyx for this purpose. The gems were carved according to the layers of the stone, so that the ground should be of a different color from the figure in relief; and it is to gems cut in this way that the word is now generally applied. One of the most famous cameos is an onyx representing 'The Apotheosis of Augustus,' 1 foot high and 10 inches wide. Cameos are often cut in shells having layers of different colors. See GEM.

Camera Lucida ("light chamber"), an optical instrument employed to facilitate the sketching of objects from nature. It acts by total reflection, and may have various forms, of which that proposed by Wollaston, and represented in the accompanying figures, is one of the commonest. The essential part is a totally reflecting prism with four angles, one of which is 90° , the opposite one 135° , and the other two each $67^\circ 30'$.

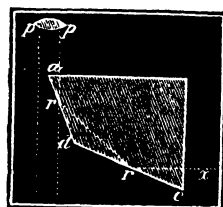


Fig. 1.

One of the two faces which contain the right angle is turned toward the object to be sketched. Rays falling in a straight line on this face as xr , are totally reflected from the face cd to the next face da , whence they are again totally reflected to the fourth face, from which they emerge in a straight line. An eye (pp) placed so as to receive the emergent rays will see an image of the object in a direction at right angles to that in which the object lies. In practice the eye is held over the corner a of the prism in such a position that one half of the pupil receives these reflected rays, while the other half receives light in a parallel direction outside the prism. The observer thus sees the reflected image projected on a real background, which consists of a sheet of paper for sketching. He is thus enabled to pass a pencil over the outlines of the image—pencil, image, and paper being simultaneously visible. It is very desirable that the image should lie in the plane of the paper, not only because the pencil-point and the image will then be seen with the same focusing of the eye, but also because parallax is thus obviated, so that when the observer shifts his eye the pencil-point is not displaced on the image. As the paper, for convenience of drawing, must be at a distance of about a foot, a concave lens, with a focal length of something less than a foot, is placed close in front of the prism in drawing distant objects. By raising or lowering the prism in its stand (Fig. 2), the image of the object to be sketched may be made to coincide with the plane of the paper. The prism is mounted in such a way that it can be rotated about either a horizontal or a vertical axis; and its top is usually covered with a movable plate of blackened metal, having a semi-circular notch at one edge for the observer to look through.

Another form of the camera lucida, that of Amici, an Italian optician, is sometimes preferred to that of Wollaston, inasmuch as it al-

CAMERA OBSCURA — CAMERARIUS

lows the observer to change the position of his eye considerably without ceasing to see the image of the object he is tracing.

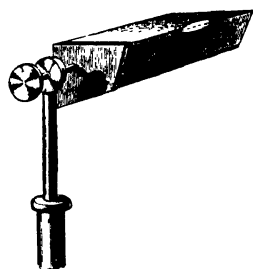


FIG. 2

The prism in this case is triangular in shape, and one of the angles is a right angle. In using it, the right angle is turned upward, so that one of the perpendicular faces is turned toward the object in an oblique direction, while the edge of the other perpendicular face meets a transparent glass plate at right angles. The rays from the object falling upon the face of the prism which is turned toward it are, after being more or less refracted, thrown upon the base of the prism, from which they are totally reflected in the direction of the other perpendicular face. In emerging from the prism at this face they are again refracted and thrown upon the transparent glass plate. By this, again, the rays are partially reflected, being thrown upward in the direction of the eye of the observer, who, looking through the plate, sees an image of the object on a sheet of paper beneath, the outlines of which can be traced by a pencil as before.

Camera Obscura ("dark chamber"), an optical instrument employed for exhibiting the images of external objects in their forms and colors, so that they may be traced and a picture formed. From certain scattered observations in the writings of Friar Roger Bacon, in the 13th century, it would appear that he was acquainted with the principle upon which the camera obscura is constructed, but the first complete description of the instrument is found in the 'Magia Naturalis' of Giambattista della Porta, published in 1569, and Porta is commonly credited with its invention.

In its simplest form the camera obscura consists of a darkened chamber, into which no light is permitted to enter excepting by a small hole in the window-shutter. A picture of the objects opposite the hole will then be seen on the wall, or a white screen placed so as to receive the light coming through the opening. The images thus obtained become sharper as the size of the hole is diminished; but this diminution involves loss of light, so that it is impossible by this method to obtain an image at once bright and sharp. This difficulty can be overcome by employing a lens. If the objects in the external landscape are all at distances many times greater than the focal length of the lens, their images will all be formed at sensibly the same distance from the lens,

and may be received upon a screen placed at this distance. The images are inverted, and are of the same size whether the lens is in position or not, so long as the screen remains fixed; but they are far sharper and more distinct when the lens is used. As exhibited at seaside resorts and other places of amusement, the camera obscura consists of a small building or of a tent surrounded by opaque curtains, and having at its top a revolving lantern, containing a lens with its axis horizontal, and a mirror placed behind it at a slope of 45° , to reflect the transmitted light downward on a sheet of white paper lying on the top of a table. Images of external objects are thus depicted on the paper, and their outlines can be traced with a pencil if desired. It is still better to combine lens and mirror in one by the arrangement represented in section in the figure. Rays from external objects are first refracted at a convex surface, then totally reflected at the back of the lens (or prism), which is plane, and finally emerge through the bottom, which is concave, but has a larger radius of curvature than the first surface. The two refractions produce the effect of a converging meniscus. The camera obscura, which was formerly chiefly employed for purposes of amusement, has now become well-known from its application to photography.

The instrument employed by photographers (and called simply a "camera") varies in general design according to the use to which it is to be put. It consists essentially, however, of a light-tight box, the length of which can be adjusted by means of a bellows. A lens or object-glass is secured to the front end of the box, and the bellows is drawn out until the lens throws a distinct image of the object upon a ground-glass screen at the back of the camera. The object-glass is usually compound, consisting of two single lenses, an arrangement which is very commonly adopted in optical instruments, and which has the advantage of giving the same effective focal length as a single lens of smaller radius of curvature, while it permits the employment of a larger aperture, and consequently gives more light. When the image upon the ground-glass screen has been rendered as sharp as possible, the screen is withdrawn and replaced by a sensitized plate, which is affected chemically by the light rays so as to retain a permanent impress of the image. The impression thus produced upon the sensitized plate is not visible at first, but is brought out, or "developed," by subsequent treatment with chemicals. See PHOTOGRAPHY.

Camera, Photographic, a camera obscura so constructed that sensitized plates or films may be placed at the back and receive the image. There are many styles of camera in use, those of the tripod variety being used for portraits, and landscapes where a long exposure is required, and the hand camera used by tourists on account of its convenient shape and size. See CAMERA OBSCURA; PHOTOGRAPHY.

Camerarius, Joachim, yō'āh-īm kā-mā-rā'rē-oos, German scholar: b. Bamberg, 12 April 1500; d. Leipsic, 17 April 1574. He contributed to the progress of knowledge, in the 16th century, by his own works as well as by editions of Greek and Latin authors with com-

mentaries, and by a better organization of the universities at Leipsic and Tübingen, and of the gymnasium at Nuremberg. He also took an important part in the political and religious affairs of his time. He was a friend of Melancthon, and was held in great esteem by the emperors Charles V., Ferdinand I., and Maximilian II. In 1555 he was deputy of the University of Leipsic to the Diet of Augsburg. His proper name was Liebhard, but he changed it to Camerarius, because his ancestors had been chamberlains (late Latin *camerarii*) at the court of the bishops of Bamberg. His son Joachim (1554-98) became known as a botanist.

Camerarius, Rudolph Jakob, roo'dölf yä'-kōh, German botanist: b. Würtemberg, 12 Feb. 1665; d. Tübingen, 11 Sept. 1721. To him is ascribed the discovery of the sexual relation in plants. He was in charge of the botanic gardens at Tübingen and was also a medical professor.

Camerino, kä-mā-rē'nō (ancient CAMERINUM), Italy, a town in the province of Macerata, 41 miles southwest of Ancona. It is the seat of an archbishopric, and contains some good public buildings, among which are the archiepiscopal palace and the cathedral. There is a university, founded in 1727. Silk is grown and manufactured here. Pop. (1901) 12,542.

Camerlen'go (It. *camerlingo*, "a chamberlain"), one of the highest officers of the Vatican court. A cardinal Camerlengo, during a vacancy in the holy see, takes charge of all the temporalities, and presides over the apostolic chamber or palace.

Cam'eron, Archibald, American clergyman: b. Scotland, about 1770; d. 1836. After studying at Transylvania Seminary, Lexington, Ky., he was ordained in 1796, and in the same year assumed charge of churches at Big Spring, Akron, and Fox Run. Until 1828 he performed itinerant services, and then became minister of the churches at Mulberry and Shelbyville. The Presbyterian Church in Kentucky owes much to his pioneer labors. His published works include: 'The Faithful Steward' (1806); 'An Appeal to the Scriptures' (1811); 'A Defense of the Doctrines of Grace' (1816); and 'A Reply to Some Arminian Questions on Divine Predestination' (1822).

Cameron, Arnold Guyot, American educator: b. Princeton, N. J., 4 March 1864. He was graduated at Princeton University in 1886, and during the next two years studied abroad. In 1888-91 he was professor of French and German languages and their literatures in Miami University; in 1891-7, assistant professor of French in the Sheffield Scientific School of Yale University; and in 1897 accepted the chair of French at the John C. Green School of Science of Princeton University. He is editor of the text-books: 'Daudet'; 'Mérimée'; 'Loti'; 'Coppée and Maupassant'; and 'The Goncourts.'

Cameron **SIR Charles**, Scotch journalist and politician: b. Dublin, 1841. He was educated at Madras College, St. Andrews, Trinity College, Dublin, and at medical schools in Paris, Berlin, and Vienna. He edited the *North British Daily Mail* from 1864 to 1874, and from the latter year till 1885 was member of Parliament

for Glasgow. From 1885 to 1895 he sat for the College division, Glasgow, and for the Bridgeton division 1897-1900. The adoption of six-penny telegrams was the result of a resolution which he introduced in the House, and he was likewise instrumental in the conferring of municipal franchise upon women in Scotland. His publications include many pamphlets on political, social, and medical subjects.

Cameron, SIR Charles Alexander, Irish physician: b. Dublin, 16 July 1830. He was elected public analyst for the city of Dublin in 1862. He was the only one who succeeded in applying the Adulteration of Food Act of 1860. In 1867 he was elected professor of hygiene or political medicine in the Royal College of Surgeons, in Ireland. His lectures on hygiene, open to ladies, were largely attended. He was knighted in 1886, in recognition of his services to public health. He has written: 'Chemistry of Agriculture' (1857); 'Lectures on Public Health' (1868); 'History of the Royal College of Surgeons, Ireland, etc.' (1886); 'Elementary Chemistry and Geology' (1896); etc.

Cameron, Charles Duncan, English soldier: d. 1870. He served in the Kaffir war (1846-7), in the Crimean war, and later at Kars. In 1862 he became British consul in Abyssinia, and having undertaken to deliver a letter from Queen Victoria to King Theodore, was imprisoned by the king for two years on the charge of interfering in the politics of that country. He was released only to be shortly imprisoned again, together with Rassan, agent of the British government, and others, their final release being effected by the advance of English troops upon Theodore's territory. An account of these matters by Cameron was published in the 'Parliamentary Printed Papers' (1868-9).

Cameron, Donald Andreas, English civil servant: b. 1856. He filled the post of consul at Suakin, 1885-8, and at Bengazi, 1888-9. He was judge of the native court of appeals at Cairo 1889-97 and then, returning to the consular service, became consul at Port Said for the Suez Canal. He has published 'Arabic-English Vocabulary' (1892); 'Egypt in the 19th Century' (1898).

Cameron, Emily Lovett, English novelist: b. Walthamstow; married to H. Lovett Cameron, about 1876. Her novels deal mostly with personal complications, and include: 'Juliet's Garden' (1877); 'Deceivers Ever' (1878); 'Vera Nevill' (1880); 'In a Grass Country' (1885); 'The Cost of a Lie' (1886); 'The Dead Past' (1886); 'Pure Gold' (1887); 'A North Country Maid'; 'Jack's Secret'; 'A Sister's Sin'; 'A Bad Lot'; 'A Soul Astray'; 'The Craze of Christina'; 'Bitter Fruit'; 'An Ill Wind.'

Cameron, George Frederick, Canadian poet: b. New Glasgow, Nova Scotia, 1854; d. 1885. He was educated at Queens' University, Kingston, Ontario; resided for a time in the United States; returned to Canada, and edited the *Kingston News*. As a lyrical poet he has received high praise from leading critics, and was accorded an eminent position by some of the great contemporary English poets. See Stedman, 'Victorian Anthology' (1895).

Cameron, Henry Clay, American educator: b. Shepherdstown, Va., 1 Sept. 1827.

CAMERON

He was graduated at Princeton College in 1847, and at the Princeton Theological Seminary in 1855; and has been connected with the department of Greek at Princeton since 1852. He has twice been chosen to the Presbyterian General Assembly, and has written 'Princeton Roll of Honor'; 'History of the American Whig Society'; 'Old Princeton: Its Battle, Its Cannon, etc.'

Cameron, Hugh, Scottish artist: b. Edinburgh, 1835. He is a well-known and popular painter of portraits and figure pieces, and among his works are: 'Maternal Care'; 'Age and Infancy'; 'Haymakers Resting'; 'A Lonely Life'; 'The Rivals'; 'The Timid Bather.'

Cameron, James Donald, American capitalist and politician: b. Middletown, Pa., 14 May 1833. He is the oldest son of Simon Cameron (q.v.), and was graduated from Princeton College in 1852. He devoted himself to business pursuits and in 1861 was made vice-president and two years later president of the Northern Central R.R. He remained in this office till 1874. In 1876 President Grant appointed him secretary of war, and in 1877 he succeeded his father as United States senator from Pennsylvania. He was re-elected in 1885 and 1890.

Cameron, John, Scottish scholar: b. Glasgow, 1579; d. 1625. In 1600 he went to the Continent, where his ability and erudition secured for him several appointments at Bergerac, Sedan, Saumur, and other seats of learning. Returning to Great Britain in 1620, he was two years later appointed principal of the university of Glasgow; but in less than a year returned to Saumur, and thence to Montauban, where he received a divinity professorship. Here, as at Glasgow, his doctrine of passive obedience made him many enemies, by one of whom he was stabbed in the street, and he died from the effects of the wound in 1625. Sir Thomas Urquhart styles him a "walking library," and Milton, "an ingenious writer in high esteem." He was considered one of the best scholars of his day; in biblical criticism he was inclined to be perverse; where there was a difficulty he usually chose the opposite view to that held by other divines, especially Beza. His theological opinions were of a somewhat lax character, his eight works, in Latin and French (10 vols., 1616-42), being said to be the foundation of Moses Amyraut's doctrine of universal grace (1634). His followers are sometimes called Cameronites.

Cameron, Richard, Scottish Covenanter: b. Falkland, Fifeshire, 1648; d. Ayrsmoss 22 July 1680. He was at first a schoolmaster, and for a time was tutor in the family of Sir Walter Scott of Harden. Being converted by the field-preachers, he became an enthusiastic votary of the Covenant. On the 20th of June 1680, in company with about 20 other persons, well armed, he entered the village of Sanquhar, and proclaimed at the cross that he and those who adhered to him renounced their allegiance to the king on account of his having abused his government, and also declared a war against him and all who adhered to him, at the same time avowing their resolution to resist the succession of his brother the Duke of York. The privy council immediately put a reward of 5,000 merks upon Cameron's head, and 3,000 upon

those of Cargill and Douglas, his associates; and parties were sent out to waylay them. The little band kept together in arms for a month in the mountainous country between Nithsdale and Ayrshire. But on the 22d of July, when they were lying in Ayrsmoss, near Auchinleck in Ayrshire, Bruce of Earlsall approached them with a party of horse and foot much superior in numbers. A brief skirmish took place, in which the insurgents were allowed even by their enemies to have behaved with great bravery; but nothing could avail against superior numbers. Cameron being among the slain, his head and hands were cut off and carried to Edinburgh, along with the prisoners. The name of Cameron was applied to the small but zealous sect of Presbyterians which he had led in life, and was also used in a wider and looser sense. The 26th Regiment, which was raised at the Revolution out of the west-country people who flocked to Edinburgh, was styled on that account the Cameronian Regiment. It is now known as the Cameronians or Scottish Rifles. Consult Herkless, 'Richard Cameron' (1896). See CAMERONIANS.

Cameron, Sir Roderick William, Canadian capitalist: b. Williamstown, Ontario, 25 July 1825; d. 24 Oct. 1900. He entered mercantile life in New York as a youth and acquired a large fortune as an exporter and importer. He was knighted in 1883. He was well known as a turfman and yacht owner, and was prominent in Canadian-American diplomacy.

Cameron, Simon, American statesman: b. Maytown, Lancaster County, Pa., 8 March 1799; d. there, 26 June 1889. He learned printing and in 1820 he was editor of a paper in Doylestown, Pa., and in 1822 held a similar post in Harrisburg. He then interested himself in banking and the building of railroads, and for a time served as adjutant-general of Pennsylvania. From 1845 to 1849 he was United States senator from Pennsylvania, elected by the Democratic party. He became a member of the Republican party on its formation, and in 1856 was again elected United States senator. He was unsuccessfully supported for the offices of both President and Vice-President in the National Convention of 1860, and in 1861 was appointed secretary of war by President Lincoln. He advocated the arming of fugitive slaves and other extreme measures. In January 1862 he resigned from the Cabinet, and was appointed minister to Russia. He succeeded in gaining the support of the Russian government for the Union. In November of the same year he resigned, and lived in retirement till 1866, when he was again elected to the United States Senate. In 1872 he became chairman of the Committee on Foreign Affairs. In 1877 he retired from the Senate in favor of his son, James Donald Cameron. His influence over the Republican party was strong, and his power in the politics of his State practically absolute. He was a vigorous opponent of civil service reform during the administration of President Hayes.

Cameron, Verney Lovett, English traveler in Africa: b. Weymouth, 1 July 1844; d. Leighton Buzzard, 26 March 1894. He entered the British navy in 1857, and in 1872 was chosen by the Royal Geographical Society of London to conduct an expedition for the relief

CAMERON — CAMILLUS

of Dr. Livingstone. He was only in time to meet the remains of Livingstone at Unyan-yembe, but pushed onward to Ujiji on Lake Tanganyika, and partly circumnavigated this great sheet of water, establishing the fact that its outlet was the Lukuga. Not being able to follow the Lualaba River downward, he continued his journey westward to Benguela, and was thus the first to cross tropical Africa from east to west. Returning to England in 1876, he was raised to the rank of a commander. In 1878 he made a journey through Asia Minor and Persia in order to satisfy himself as to the feasibility of a railroad connecting India with the Mediterranean, and in 1882 with Sir Richard Burton explored the country behind the Gold Coast. He published accounts of his journeys in his 'Across Africa' (1877); 'Our Future Highway to India' (1880); and 'To the Gold Coast for Gold' (1883, with Sir R. F. Burton). He died from an accident in the hunting field.

Cameron Highlanders, the old 79th Regiment in the British army, raised in 1793 by Allan Cameron of Erroch. It wears the Highland dress and now forms the first battalion of the King's Own Cameron Highlanders. There is not as yet a second battalion linked with it.

Cameronian Regiment, a British regiment raised in 1689 among the Camerons of the west of Scotland to support William III., and long famous as the 26th Regiment. It forms now the first battalion of the Cameronians (Scottish Rifles), the second battalion being the old 90th Regiment.

Cameronians, a sect of Scotch Presbyterian dissenters, named after Richard Cameron. James I. had enforced on his Scottish subjects a liturgy which the people abhorred, and this led, in 1638, to the formation of the covenant, "in behalf of the true religion and the freedom of the kingdom." The organization of the Scottish presbytery was still further completed in the adoption of the Presbyterian form of Church government, a Calvinistic confession of faith, and the two catechisms, which documents are the standards of the Scottish kirk to this day. Throughout the revolution of 1688 the Cameronians maintained inflexible hostility to the royal usurpation of religious freedom. They supported the Prince of Orange on his assuming the crown of England, but were displeased and disappointed by the form in which the Presbyterian Church was restored. In 1709 they exerted all their influence against the union of Scotland and England. The presbytery of this denomination was not organized until 1 Aug. 1743, when an act of toleration was procured in their favor. They still have a distinctive existence in Great Britain and America, under the name of Reformed Presbyterians.

Cameroons, *kā-mē-roon'*, or **Kamerun**, a German colonial possession in West Africa extending inland from the Bight of Biafra to the northeast and north as far as Lake Chad, and having an area of 191,130 square miles. It is separated from the British territory on the northwest by a line running north-east from the Rio del Rey to a point on the river Benue east of Yola, and from there north-northeast to the south shore of Lake Chad. From French Congo on the south it is marked off by a line running east from the mouth of the Campo River to the river Sanga, and from

there the eastern boundary proceeds first north-west to lat. 4° N., lon. 15° E., then along that meridian to about lat. 8° 30' N., when it proceeds northwest to the parallel of 10°, which forms the boundary eastward to the Shari River. This river itself to its mouth in Lake Chad serves as the northeastern boundary. The territory receives its name from the Cameroon River, which enters the Bight of Biafra by an estuary nearly 20 miles wide. The swamps along the banks of the river render this district unhealthy for Europeans. Northwest of the river lies the volcanic group called the Cameroon Mountains, which rise to a height of 13,760 feet. The lower slopes of these mountains are more healthy, and are covered with ebony, red-wood, and palm-trees. More important than the Cameroon River is the much longer Sangha or Mbam, entering the Bight of Biafra a little south of the former, and navigable for 40 miles inland to Idia. Among cultivated plants are the banana, oil-palm, cocoanut, groundnut, manioc, yam, sweet-potato, and colocasia; of more recent introduction are cacao, coffee, tobacco, etc. Among the minerals are gold and iron. There is a considerable trade in cotton, ivory, and oil. The inhabitants are almost entirely of the Bantu stock, widely diffused throughout the more southerly portion of the continent, and many of them have almost regular European features. The coast of the Cameroon territory was annexed by Germany in 1884, and the interior has since been acquired, the whole being now a German colony under a governor. The seat of government is at Cameroons, a group of native villages on the estuary of the Cameroon River, but the greater part of the territory is only nominally under German rule. Pop. 4,500,000.

Camil'la, in Roman fable, a virgin, said to have been a daughter of Metabus, a Volscian king, and to have aided Turnus against Æneas (Virgil, 'Æneid,' vii.).

Camille, *ka-mêl* ("La Dame Aux Camélias"), a novel by Alexandre Dumas the younger, published in 1848, the celebrated play founded upon it appearing in 1852 at the Vaudeville Theatre in Paris. The popularity of both the novel and the play is owing, perhaps, to the fact that the incidents of the story admit of many interpretations of the character of the heroine.

Camil'us, **Marcus Furius**, Roman patrician: d. 365 B.C. He is famous as the deliverer of the city of Rome from the Gauls. In 396 B.C. he was made dictator during the Veientine war, and captured the town of Veii by mining, after it had defied the Roman power for 10 years. In 394 B.C. Camillus besieged the Falerii, and by an act of generosity induced them to surrender. Three years later the envy and jealousy of enemies caused him to exile himself for a time, and he was living in retirement when the Gauls, under Brennus, invaded and captured Rome, with the exception of the capital. Camillus was now appointed dictator a second time, and was successful in repelling the invaders. After he had been four times appointed dictator, a new invasion of the Gauls called him, at the age of 80, once more to that position, and he defeated and dispersed the barbarians. There is a certain amount of myth in the story of his life.

Caminatzin, *kä-mē-na-tsēn'*, or **Cacumazin**, Mexican king: d. 30 June 1520. He was nephew of King Montezuma, and reigned over Tezcuco, the principal city of Anahuac. The best citizens of the state, the nobles and priests, saw with indignation the humiliation of their king and kingdom under Cortez and the Spaniards. Caminatzin, with more courage and enterprise than his uncle, proposed to his subjects a declaration of war against the foreigners. The proposal was received with enthusiasm, and Caminatzin called upon the Spaniards to leave the country immediately or to expect to be treated as enemies. Cortez was preparing to march his army against Tezcuco, when the representations of Montezuma concerning the defenses of the town and the daring of the population, induced him to change his plan, and to resort to treason instead of force. At his instigation Montezuma invited his nephew to Mexico to become reconciled with the Spaniards. The answer of Caminatzin was that he could enter Mexico only to destroy the tyrants of his country. Montezuma then despatched secret agents to Tezcuco to get possession of the young prince by whatever means. His first officers and nearest friends were corrupted, and he was delivered by them to Cortez and imprisoned. He was released after the expulsion of the Spaniards, and perished during the evacuation of Mexico by the Spaniards.

Camisards, *kām'i-zārdz*, Protestants in France (in the Cévennes), who, in the beginning of the 18th century, in consequence of the persecution to which they were exposed after the revocation of the Edict of Nantes in 1685, rose against the royal deputies. The name is usually thought to be derived from "camise," a provincial form of the French word "chemise," signifying a shirt, and it is said to have been applied to them either because their ordinary outer garment was a kind of shirt or blouse, or because on certain occasions they wore their shirts above their other garments. The first occasion on which they broke out into open revolt against the royal deputies was on the night of 24 July 1702, when 50 of them attacked the house of the Abbé du Chayla, one who had signaled himself by his cruelty during the persecutions. They set free the prisoners whom they found confined in the dungeons, and put the abbé himself to death. This was the signal for a general rising of the mountaineers. The government sent troops to punish the authors of these acts. A certain Jean Cavalier, a peasant, whom a fortune-teller had pointed out as the deliverer of Israel, placed himself at the head of the Camisards. His unlimited authority with his adherents, his talents, and courage, enabled him to oppose the measures of experienced generals with so much success that negotiation was substituted for force. The Marshal Villars in 1704 made a treaty with Cavalier, by virtue of which Cavalier himself was received into the royal service as a colonel. This treaty, however, did not satisfy his associates, because it did not concede to them liberty of conscience, and on that account Cavalier was reproached as a traitor who had sacrificed the cause of his coreligionists to his own interest. At the court, too, he was received with coldness, so that in a short time he was glad to go into voluntary exile. He went to England, where Queen Anne gave him a favorable reception. *Voltaire, who became acquainted with him in*

London, speaks of him in high terms. At the time of his death Cavalier was general and governor of Jersey. The name *camisards blancs* (white camisards), or *cadets de la croix* (cadets of the cross), was given to a band of Roman Catholics formed to put down the Calvinistic camisards, who were called *camisards noirs*, or black camisards.

Cam'let, or **Camblet** (in French, *camelot*), a name applied in England to a fabric made of long wool, hand-spun, sometimes mixed with cotton or linen yarn. Various derivations of the word are given. Some consider it to be of the same root with camel, because it was originally made of camel's hair; others derive it from the Arabic *chamal*, signifying fine, because according to them it was originally made of the fine hair of the Angora goat.

Cammerhoff, *kām'mër-höf*, **John Christophre Frederic**, Moravian bishop in America: b. near Magdeburg, Germany, 28 July 1721; d. Bethlehem, Pa., 28 April 1751. He was educated at Jena, and at the age of 25 was consecrated a bishop in London and came to America as Bishop Spangenburg's assistant. He preached in Pennsylvania and New York, but his greatest successes were made among the Indians. The Iroquois adopted him into the Turtle tribe of the Oneida nation, and gave him the name of Gallichwio, or "A Good Message." In 1750 he undertook amid great hardships a tour to Onondaga. It occupied three months, embraced a distance of 1,600 miles and was filled with hair-breadth escapes. He was too weak to endure such enterprises, and died the following year. The Iroquois mourned him as a brother and said of him "He was an honest, upright man, in whose heart no guile was found." Thirty years later Zeisberger heard his name mentioned among them with deep respect and veneration. The memory of his devotion and irrepressible missionary zeal has ever been held in honor by the people of his faith.

Camões, or **Camoens**, *Luis de*, *loo-ēs dā kä-môn'ēsh*, Portuguese poet: b. Lisbon probably 1524, or 1525; d. there, 1579. His father, Simon Vaz de Camoes, was a ship-captain, who perished by shipwreck on the coast of Goa about 1552. Camoes studied at Coimbra. At that time writers were esteemed in proportion as they imitated the ancients. Camoes was inspired by the history of his country, and by the manners of his age. His lyric poems, like the works of Dante, Petrarch, Ariosto, and Tasso, belong to the literature formed under the influence of Christianity. After the completion of his studies he returned to Lisbon, where he fell deeply in love with a lady of the palace, Catharina d'Atayada. Violent passions are often joined with great talents—Camoens had both. He was exiled to Santarem on account of disputes in which his love for Catharina involved him. From despair he became a soldier, and served in the fleet which the Portuguese sent against Morocco. He composed poetry in the midst of battles, and as danger kindled his genius, so genius animated his courage. An arrow deprived him of his right eye before Ceuta. He hoped that his wounds would receive a recompense, though his talents were not appreciated; but envy opposed his claims. Full of indignation at seeing himself neglected, he embarked in 1553 for India. His

CAMOMILE

powerful imagination was excited by the heroic deeds of his countrymen in this quarter, and although he had much reason to complain of them, he could not resist the desire of celebrating their glory in an epic. But this vivacity of mind, essential to the poet, is not easily united with the moderation which a dependent condition demands. Camoes was displeased with the abuses of the government in India, and wrote a satire, which caused his banishment to Macao. Soon after he was removed to the Moluccas, but after three years of captivity a new viceroy recalled the decree of banishment against him, and appointed him administrator of the effects of deceased persons at Macao. His chief poem, the 'Lusiad,' was composed partly during the period of his captivity, and partly while he held the office of administrator. Camoes was at last recalled from his banishment. At the mouth of the river Mekon, in Cochin-China, he was shipwrecked, and saved himself by swimming—holding in one hand above the water the manuscript of his poem, the only treasure which he rescued from the waves. In Goa he encountered new persecutions; was confined in prison for alleged embezzlement of funds intrusted to him during his tenure of office at Macao, and not allowed, until his friends became responsible for him, to embark and return to Lisbon in 1569. King Sebastian, yet hardly past the age of childhood, took an interest in Camoes. He accepted the dedication of his epic (which appeared in two editions, varying both in the text and the orthography, in 1572), and being on the point of embarking on his expedition against the Moors in Africa, felt more sensibly than others the genius of the poet, who, like him, loved dangers if they led to glory. But Sebastian was killed in a battle before Alcaçar in 1578, and with him the royal family became extinct, and Portugal lost her independence. Every source of assistance, as well as every hope of Camoes, was destroyed by this event. So great was his poverty that at night a slave, whom he had brought with him from India, begged in the streets in order to support the life of his master. In this misery he yet wrote lyric poems, some of which contain the most moving complaints. This hero of Portuguese literature, the ornament of his country and Europe, died in a hospital, neglected. In 1596 a splendid monument was erected to his memory. Vasco da Gama's expedition to India is the subject of his great poem. The parts of it which are best known are the episode of Ines de Castro, and the appearance of Adamastor who, by means of his power over the storms, aims to stop Gama's voyage when he is about to double the Cape. In conformity to the taste of the time, Camoes united in this poem a narrative of the Portuguese history with the splendor of poetic description, and Christianity with mythological fables. He pleased himself with tracing the descent of the Portuguese from the Romans, of whom Mars and Venus are considered the progenitors and protectors. Since fable ascribes to Bacchus the first conquest of India, it was natural to represent him as jealous of the undertaking of the Portuguese. If the imitation of the works of classical antiquity has been of any disadvantage to the 'Lusiad,' the injury consists, perhaps, in a diminution of the originality which one expects in a work in which India and

Africa are described by an eye-witness. The general interest of the poem consists principally in the patriotic feeling which pervades it. The national glory of the Portuguese appears here in every form which invention can lend to it, and therefore the countrymen of Camoes must naturally admire this poem more than foreigners. Some critics pronounce the 'Lusiad' a more powerful and pure historical painting than Tasso's 'Jerusalem Delivered.' A valuable edition of the 'Lusiad' (Os Lusíadas, etc.) was published by Joze Maria de Souza-Botelho (Paris 1817). It has been translated into English by Fanshaw, Mickle and Duff; by J. J. Aubertin (with Portuguese text), and by Sir R. F. Burton (with 'Life of Camoes, Commentary,' etc.; 6 vols.). The works of Camoes, besides the 'Lusiad' consist of sonnets, songs, odes, elegies, eclogues, *redondillas*, epigrams, satires, letters, and three dramas 'Amphitryon,' after Plautus, 'King Seleucus,' and the 'Love of Philodemus.' Consult: Adamson, 'Memoirs of the Life and Writings of Luis De Camões' (1820); Braga, 'Historia de Camões' (1873-5); Castello Branco 'Luis de Camões' (1880); Storck, 'Luis de Camoens Leben' (1890).

Cam'omile, or Chamomile (*Anthemis*), a plant belonging to the natural order *Compositæ*. It is perennial, and has slender, trailing, hairy, and branched stems. The leaves are doubly pinnate, with linear pointed pinnæ. The flower is white, with a yellow centre. Both leaves and flowers of this plant have a strong though not unpleasant smell, and a very bitter nauseous taste; but the flowers are more bitter and aromatic than the leaves. The principal use for which camomile flowers are applied is to excite vomiting and promote the operation of emetics. They have likewise been substituted for Peruvian bark in the case of intermittent fevers or agues, but not with much success. Both the leaves and flowers are employed in fomentations and poultices. They are also administered in substance as a powder or electuary, in infusion as tea, in decoction or extract, or in the form of an essential oil obtained by distillation. Camomile flowers are sometimes used by brewers as a substitute for hops. Distilled with water, an essential oil in small quantities is obtained of a greenish color and strong pungent taste. So fragrant is the camomile plant that the places where it grows wild may easily be discovered by the somewhat strawberry-like perfume emitted when it is trodden on. This quality has sometimes induced the cultivation of camomile for a green-walk in gardens. Camomile in the United States is an importation from Europe, the commonest wild varieties being May-weed (*Anthemis cotula*), and corn camomile (*A. arvensis*). The garden camomile is *A. nobilis*.

Camomile enjoys a wide, popular reputation as a diaphoretic and diuretic. The flowers are usually made into an infusion or tea and this is drunk while hot. A poultice is also made of the flowers and applied to painful swellings, such as rheumatic joints, or ear-ache, boils, etc. There is a large amount of fixed and volatile oil in camomile to which its useful physiological and physical properties are due. Volatile oils act as vaso dilators and antispasmodics, diuretics and diaphoretics, the fixed oils permitting of long-continued heat.

CAMONICA — CAMP

Camonica, *kā-mō-nē'ka*, or **Valle Camonica**, a valley in north Italy, formed by two branches of the Rhætian Alps, watered by the Oglio, and stretching about 50 miles from north-northeast to south-southwest as far as Lake Iseo. It is a principal thoroughfare between Italy and the Tyrol.

Camorra, *kā-môr'ra*, an association in Naples, the members of which (*Camorristi*) carried on extortion as a regular business, and were to be found at markets, fairs, and all public gatherings in the exercise of their employment. They might even be hired to commit murder. The association extended its ramifications over the whole of Naples. It had central stations in all the large provincial towns, and 12 in the city of Naples, and it had a regular staff of recruiting officers. Under the former régime it did not aim at concealment; but under the present more powerful government efforts are being made to suppress it. These efforts have not yet been crowned with complete success; but it is not denied that the power of the association has been greatly diminished. The members no longer dare to carry on their business openly. The army, which was formerly infested with them, and is said still to contain a considerable number, is gradually being freed from them, and in every way they are being brought under the power of the law.

Camp, *kāñ*, **Maxime du**. See **DU CAMP**, **MAXIME**.

Camp, Walter, American writer on athletics: b. New Britain, Conn., 7 April 1859. He was graduated at Yale (1880) and soon attained prominence with such writings as 'Book of College Sports,' 'American Football,' etc. He has edited various weekly papers devoted to sports, and is well known as an authority upon college athletics and football.

Camp, in military use, the place and aggregate body of tents or huts for soldiers in the field. In modern times a difference is often made between camp and bivouac, the former signifying the quarters of an army sheltered in tents; the latter the situation of one which dispenses with them, and remains either entirely in the open air, or, when time allows it, in huts built of branches, etc. Camps, in a general sense, are of very ancient origin, since almost all nations in their infancy lived as nomads, dwelling in tents, as is the case with many tribes in Asia and Africa at the present day, for example the Arabs. Among the Greeks, the Lacedæmonians seem to have been the first who devoted attention to the art of forming military camps. The form which they adopted was the circular, that being the form which was best calculated to enable the general, who had his tent in the centre, to have a view of the whole camp, and to despatch assistance in the shortest possible time to any part of the camp that might be attacked. The Romans probably first carried the art of encampment to a high degree of perfection, on account of their many wars in distant and thinly settled regions, where their large armies found no cities to quarter in. Cæsar and several other Roman authors give us much information on their way of constructing a camp, and in Polybius we have a detailed description of the consular camp as it was made in his time. This form of camp, with some modifications, continued to be the usual one

during the whole period of the Roman domination, and down to the time of the invention of gunpowder. The site was chosen by the general himself, or by one of the military tribunes; a spot from which a view of the whole camp could be obtained. This spot was marked by a white pole as the point from which the rest of the camp was measured out, and the place where the general's tent (*prætorium*) was to be erected. The form of the camp was a square, and it was divided into two parts by a street from 50 to 100 feet wide, called the *principia* or *via principalis*, which ran across it. One of these divisions occupied about one third of the whole space, the other, the remaining two thirds; and it was in the former of these that the *prætorium* was situated, with an open area around it extending 100 feet on all sides. On the right of the *prætorium* was the *forum* or market-place, and on the left the *quæstorium*, where were the camp-stores under the superintendence of the *quæstor*. Beyond these again on each side there were select bodies of horse and foot taken from the extraordinaries, and behind this whole line of the encampment, and separated from it by a street 100 feet broad, was the place reserved for the main body of the extraordinaries, and for foreigners and occasional auxiliary troops. Immediately in front of the line of the encampment first described the tents of the military tribunes and of the *præfecti*, or officers of the allies, were erected, the former before the *forum* and *quæstorium*, the latter before the select bodies of horse and foot. These tents lined the *principia* on the side of the *prætorium*. On the other side of the *principia* the main body of the army was quartered, the allies being stationed on the right and left, the two Roman legions which belonged to every consular army in the middle. The whole was surrounded with a ditch (*fossa*) and a rampart (*vallum*) at the distance of 200 feet from the tents. On every side of the camp there was a gate. That behind the *prætorium* was called *porta prætoriana*, the one on the opposite side *porta decumana*. The other two were at the ends of the *principia*, and were called respectively *porta principalis dextra* and *sinistra*. The camp was improved in strength and convenience according to the time that it was occupied, and in some cases, from the want of fortresses, it was made the basis of their military operations.

Since the invention of gunpowder, intrenched camps, such as that just described, have been of very little service, as they afford no protection against projectiles shot from long ranges. What are usually known as intrenched camps at the present day are much more elaborate affairs and cover a much greater area. They may consist of intrenched areas permanently connected with and under the protection of fortified places; thus they are sometimes attached to certain large cities on the chief roads, partly in order to defend them against the first attack of the enemy, and to prevent his possessing himself easily of the important resources which they afford; partly to give to retreating armies rallying-points for support to numerous soldiers. Camps which, though intrenched, are to be occupied merely for the period of a campaign, or which serve as a refuge for a few days only to a subordinate army, are termed "lines" or "temporary posi-

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tions." An example of the former was exhibited by the extensive lines of Torres Vedras. From the perfection of modern artillery strong detached forts form the chief defensive feature of intrenched camps of the present day. For temporary encampments in the field a position is selected such as is not only well supplied with wood, forage, water, and the other necessities of a camp, but also one that may be easily defended. Rifle-trenches, gun-pits, etc., may be constructed, sentinels being posted to guard against surprise. It has recently become common to form camps in time of peace for the sake of disciplining the soldiers to a camp life, and exercising them in the evolutions connected with camps. These are camps of instruction, of which examples are seen in the United States, where the organizations of the National Guard in the different States are accustomed to annual encampments for these purposes; also in the camp for British troops at Aldershot, and temporary camps throughout Great Britain for the training of the militia and volunteers, and in the like customs and establishments of other countries. The military camp of the United States army is arranged according to directions given in the 'Army Regulations' published by the War Department.

Camp Al'leghany, W. Va., a Confederate camp where an engagement took place 13 Dec. 1861. After the affair at Camp Bartow, 3 Oct. 1861, the Union troops had remained at Cheat Mountain Summit. Gen. R. H. Milroy, who was in command 12 Dec. 1861, determined to attack Camp Alleghany, the summit of Alleghany Mountain, to which the Confederates had fallen back from Camp Bartow, and which was held by Col. Edward Johnson, with 1,400 men and eight guns, partially entrenched. With 1,800 men Milroy marched to Camp Bartow, 12 December, and made his dispositions. One column of 900 men, under Col. James A. Jones, was to ascend the mountain, until near its summit, when, leaving the road, it was to move to the left and attack Johnson's right and rear, while another column of 900 men, under Col. G. C. Moody, was to move down the Greenbank road and by a circuitous route, concealed by heavy forests, assail Johnson's left. The attacks were to be simultaneous at 4 A.M. of the 13th. Jones started at midnight, gained his assigned position on time, and waited for Moody, but his presence being discovered, he was quickly engaged and for a time met with success, driving the Confederates before him, but Johnson rallying his troops on that flank and fighting desperately, Jones was repulsed after a two-hours' contest, leaving his dead and many wounded on the field. While Jones was being driven from Johnson's right Moody was slowly approaching his left. He had been delayed by the difficulties of his route, and it was after 8 o'clock when he became engaged, and was met by such a severe fire of artillery and musketry that he could make no progress, but continued a desultory skirmish until afternoon, when he fell back, and the whole force, reuniting at Camp Bartow, marched back to Cheat Summit. The action was the most severely contested one of the West Virginia campaign of 1861. The Union loss was 20 killed, 107 wounded, and 10 missing; the Confederate loss 20 killed, 98 wounded, and 28 missing. Consult 'Official Records,' Vol. V.

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Camp Bartow, bär'tō, or **Greenbrier River**, W. Va., a place where an engagement in the Civil War was fought, 3 Oct. 1861. On 2 October the Confederates held Camp Bartow, where the road from Beverly to Staunton crosses the Greenbrier River, with about 2,500 men and eight guns, under command of Gen. H. R. Jackson. Gen. J. J. Reynolds, commanding the Union troops at Cheat Mountain Summit, 12 miles west, concluded to feel Jackson's position and, if possible, force it. He marched at midnight of the 2d with about 5,000 men and 13 guns, drove in a picket post west of the Greenbrier on the morning of the 3d, and coming to within 600 or 700 yards of Jackson's intrenched position beyond the stream, opened on it with his artillery, the Confederates promptly replying. Several guns were disabled on either side, and Reynolds then, under cover of a demonstration on Jackson's left, moved with six regiments to turn his right. The regiment to make the demonstration on the left crossed the stream, but was quickly driven back, and when the six regiments were about to cross the stream on Jackson's right they were met by such a severe fire of artillery and musketry that Reynolds deemed further effort inadvisable and withdrew with a loss of 43 killed and wounded. The Confederate loss was 39 killed and wounded. Consult 'Official Records,' Vol. V.

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Camp Diseases, disorders common in camp life and more or less incidental to the conditions of active military service, which are often such as to increase the virulence of ordinary diseases. Improper food, exposure to wet and to extremes of temperature, hard muscular labor, unhygienic surroundings, and immoral or intemperate habits, contribute to the general conditions in which disease flourishes. Some of the troublesome infectious diseases of military life are: Asiatic cholera, bubonic plague, cerebro-spinal meningitis, diarrhoea, dysentery, influenza, malaria, measles, mumps, typhoid fever, and tuberculosis. Alcoholism and venereal diseases depend on personal habits; bronchitis, frost-bite, pneumonia, rheumatism, snow-blindness, and sunstroke come from exposure. Scurvy was formerly common, but it is now not often met with. From forced marches or severe exertion the soldier often suffers from heart-trouble.

Camp-meetings, gatherings for religious purposes, held usually in thinly populated districts, and continued for several days at a time, with the view of securing prolonged and uninterrupted spiritual exercises. Assemblies of a like kind have been more or less usual at various periods in the history of the Christian Church; but it was in connection with Methodism in the United States that such meetings became especially prominent. The introduction of the protracted camp-meetings into England in 1799 by Lorenzo Dow led to the separation of the Primitive Methodists from the Wesleys. See CHAUTAQUA.

Campa. See ANTI.

Campagna, Girolamo, jē-rō'lā-mō kām-pān'ya (called DE VERGNA), Italian sculptor: b. Verona, 1552; d. about 1623. He was a pupil and assistant of Cataneo, many of whose works he completed. Among his own works are the bronze group for the high altar of San Giorgio;

CAMPAGNA DI ROMA — CAMPANA

a Madonna and child in San Salvatore; and the altar in the Santi Giovanni e Paolo (all at Venice).

Campagna di Roma, *kām-pān'ya dē rō mā*, a territory in Italy which comprehends the greater part of old Latium, from 30 to 40 miles wide and 100 long. By it is usually understood the desert plain which begins near Ronciglione or Viterbo, and including the Pontine Marshes, extends to Terracina. In the middle of this region lies Rome, on its seven hills, and on the Tiber. The lakes of the Campagna are evidently craters of extinct volcanoes. Thus the Lake Regillus above Frascati, lies at the bottom of an inverted cone of hard, black lava, rising in wild and naked masses from 40 to 60 feet high. The craters containing the lakes of Albano and Nemi have a very regular conical form. The Lake of Albano is also remarkable for its aqueduct, or *emissarium*, one of the most ancient and excellent works of the Romans, which discharges the waters of the lake through the mountains. It answers its original purpose even at the present day. There are, also, many sulphur springs here, particularly between Rome and Tivoli, where the water issues almost boiling from the earth, and forms the Lake of Solfatara, which contains floating islands, consisting of a calcareous deposit, that collects round substances thrown into the water. The vapors which rise from the ground all over the Campagna, and especially in the neighborhood of this lake, render the whole district unhealthy. The soil of the Campagna is in general dry, but very fertile in the lower parts. In the middle of the summer, when fevers render a residence in the Campagna very dangerous, all the inhabitants who can do so take refuge in the neighboring towns or in Rome itself; or they may retire with their cattle to the mountains. Besides huts, innumerable ruins of temples, circuses and monuments are scattered over the Campagna, particularly near the Via Appia; and long rows of aqueducts, some in ruins, some in a state of preservation, are overgrown with ivy and other plants. In the winter flocks of sheep pasture in these solitudes; during the summer they are driven up the Apennines. Herds of half-wild cattle remain during the whole year in the Campagna. The herdsmen are mounted, and armed with long lances, with which they manage the cattle very skilfully. Scarcely a ninth part of the Campagna is cultivated, the rest is used for pasturage. In the times of the ancient Romans, this dreary solitude exhibited a smiling picture of abundance and fertility. Yet even in those times the climate was far from being a healthy one. Strabo, Livy, Cicero, Horace, and others agree in describing the districts in the neighborhood of Rome, Ardea, and other towns which stood in what is now the Campagna di Roma, as extremely unwholesome, especially at certain seasons of the year; and it was only through the greatest exertions on the part of the ancient cultivators, and the numerous aids to cultivation that stood at their command, that this tract, now so desolate, was then made so productive. Several of the Popes, particularly Pius VI., have attempted to lessen the insalubrity of the air by the draining of the Pontine Marshes which form the southern portion of the tract. In recent years the Italian government has

taken up the problem, and has accomplished much in the way of reclamation, increasing the healthfulness of this historic region.

Campagnola, *kām-pān-yō'la*, **Domenico**, Italian painter and engraver: flourished about 1520. He was probably born at Padua, where he was a rival of Titian in painting the frescoes in the Scuola del Carmine and in the Scuola del Santa. He is considered one of the best painters of the Venetian school, and his work as an engraver is less important. Of 14 engravings which are known to belong to him, 10 are dated 1517, and one, 'The Descent of the Holy Ghost,' bears the date 1518.

Campaign', in military language, the season during which armies keep the field. Formerly, when war was not carried on with so much impetuosity as at present, campaigns lasted only during the warmer months; and toward winter the troops went into winter quarters, when the officers of the opposing armies often met very amicably at balls and other entertainments; but of late armies have kept the field through the winter till a decisive victory has been gained. Thus the Germans in the war of 1870 with France prosecuted the siege of Paris all through the winter, while at the same time other armies were operating in different parts of France.

Campan, Jeanne Louise Henriette, *zhān loo-ēz on-rē-ēt kan-pān* (GENEST): b. Paris, 6 Oct. 1752; d. Mantes, 16 March 1822. She became reader to the daughters of Louis XV.; gained the favor of the wife of the dauphin, afterward Queen Marie Antoinette, who gave her in marriage to the son of her private secretary, M. Campan, and appointed her the first lady of the bed-chamber. Madame Campan gave her patroness many proofs of fidelity and attachment and wished to follow her into the temple after the 10th of August 1792, which, however, Péthion did not allow. After the fall of Robespierre, Madame Campan established a boarding school for the education of young ladies at St. Germain, which soon acquired a wide reputation. On this account Napoleon appointed her the principal of an institution founded by him for the daughters of the officers of the Legion of Honor, at Ecouen, which she organized and superintended for seven years. After the restoration Louis XVIII. abolished this institution, and Madame Campan lost her situation. Her only son died in 1821, in consequence of ill treatment inflicted because he was a relation of Marshal Ney. She published: 'Memoirs Respecting the Private Life of the Queen Marie Antoinette, with Recollections of the Times of Louis XIV., XV., and XVI.' (1823); 'Journal Anecdotique' (1824); 'Correspondance inédite avec la Reine Hortense' (1835); 'De l'éducation.'

Campana, Pedro, *pā'drō kām-pā'ña* (in the Netherlands known as PETER DE KEMPENEER), Flemish painter of Spanish descent: b. Brussels, 1490; d. there, 1580. In 1530 he went to Italy for study of the Italian masters; he later lived in Seville, Cordova, and other cities of Andalusia, and in 1562 returned to Brussels. In style he combined to some extent the characteristics of the school of Raphael and the Flemish painters. His best known work is in the cathedral at Seville, the 'Descent from the Cross'; other

paintings of his are in the same city and he also painted the altar-piece of the Church of Santa Anna in Triana, a suburb of Seville.

Campanella, Tommaso, tòm-mă'sō kām-pa-něl'la, Italian philosopher: b. Stilo, Calabria, 5 Sept. 1568; d. Paris, 1639. He displayed great quickness of parts when quite young, and at the age of 15 entered into the order of the Dominicans. He studied theology and other branches of knowledge with assiduity, but was principally attracted by philosophy. The opinions of Aristotle, then generally taught in the schools, appeared to him unsatisfactory; and in 1591 he published at Naples a work entitled 'Philosophia Sensibus Demonstrata,' intended to show the futility of the prevailing doctrines. This book procured him some admirers, and more enemies. He then went to Rome, and afterward to Florence, where he was well received by the Grand-duke Ferdinand. In 1598 he returned to Naples, and revisited shortly after Calabria, where, in the following year, he was arrested on a charge of conspiracy against the Spanish government, to which Naples was then subject. A scheme was imputed to him of having engaged the Turks to assist him in making himself master of Calabria. On this improbable and apparently unfounded accusation he was imprisoned, and after being repeatedly tortured, condemned to perpetual confinement. In this situation he wrote many learned works, afterward published. At length, in 1626, Pope Urban VIII. procured his removal to Rome, and in 1629 gave him his liberty, and bestowed on him a pension. Dreading some further persecution from the Spaniards, he withdrew in 1634 to France, where he was honorably received by Louis XIII. and Richelieu, and much esteemed by the learned men of that country. He died at the monastery of his order. Among his numerous works may be mentioned: 'Atheismus Triumphatus' (1631); 'Monarchia Messiae' (1633); 'Defense of Roman Catholicism and the Papal Supremacy'; 'Discorsi della Libertà' (1633); 'Prodromus Philosophiae Instaurandæ' (1617); 'De Sensu Rerum et Magia' (1620); 'De Monarchia Hispanica Discursus' (1640). A 'Life of Campanella,' by Baldacchini, was published at Naples (1840-3).

Campanero. See BELL-BIRD.

Campani-Alimenis, Matteo, măt-tă'ō kām-pă'nē ā-lē-mă'nīs, Italian mechanician: fl. 17th century. In optics, his greatest achievement was the manufacture of the object-glasses through which Cassini discovered two satellites of Saturn. He wrote 'Horologium solo naturæ motu' (1678), a work on the construction of clocks.

Campa'nia, the ancient name of a province of Italy, in the late kingdom of Naples, which, partly on account of its natural curiosities, including Vesuvius, the Phlegrean fields, the Lake of Avernus, and partly for its remarkable fertility, was a favorite resort of the distinguished Romans, who built there magnificent country houses. Cumæ, Puteoli, Naples, Herculaneum, Pompeii, Baia, Stabia, Salernum, and Capua, the principal cities of Campania, are names rich in classical associations. The Appian and Latin ways led into the interior of this charming province. Even now Campania, or the province of Caserta, is the most beautiful and fruitful part of Italy, and no traveler can wish for a more

delightful country than the fields of Campania, filled in the month of April with barley four feet high, and adorned with lofty poplars, which are connected by luxuriant vines, forming a canopy over the fields. "There," says Goethe, "it is worth while to till the ground."

Campanile, a detached tower containing bells. Campaniles are most common in Italy. Several of them have deviated considerably from the perpendicular, in consequence of their great height and narrowness of base. The campanile of Pisa, called *Torre Pendente* (or Leaning Tower), is one of the most remarkable. Its architects were Bonano of Pisa, and Wilhelm of Innsbruck, and it was begun in 1174. The tower consists of eight stories, each of which is surrounded by columns, and it inclines nearly 13 feet from the perpendicular. Another celebrated campanile is that which was begun at Florence in 1334, after the designs of Giotto, and finished by Taddeo Gaddi. Its height approaches 300 feet, and it is adorned with 54 bas-reliefs, and 16 statues, representing biblical, pagan, and allegorical subjects. Giotto intended to surmount this tower with a spire nearly 100 feet high, but his intention was never carried out. The Torre degli Asinelli and the Torre Garisenda at Bologna are also remarkable specimens of the campanile. The campanile of St. Mark's Church, Venice, is probably the best known to Americans. Begun as far back as 888 by Pietro Tribuno, it did not assume the form which tourists are familiar with until 1590. For centuries its majestic height dominated the city. Its pinnacle was about 325 feet from the ground.

In 1417 a marble top was put on the old tower. One hundred years later it was crowned with the figure of an angel nearly 16 feet high. Simple in design, the campanile stood out in sharp contrast with the famous belfry of Florence.

The Loggetta at the foot of the campanile was built by the famous Jacopo Sansovino, and was the rendezvous for the nobles of the town. Sansovino adorned it with reliefs and with bronze statues of Minerva, Apollo, Mercury, and Peace. The bronze doors of the vestibule have long been regarded as masterpieces that deserve to rank by the side of the work of the great Italian sculptors. Like many another Italian structure, the Loggetta lost much of its old-time significance. From a meeting-place for the nobles it degenerated into a waiting room for the commanders of the guards during the sessions of the great council. Latterly it was used for auctions and lottery drawings.

The tower was peculiar in that it had no staircase. It was ascended by a winding inclined plane, having 38 bends and ending in a few steps. The tower was always open; but visitors were not allowed to enter alone. For that reason a single traveler was compelled to engage a bystander to accompany him.

From time immemorial a watchman was stationed in the lantern. In the days of the grand maritime Venetian republic it was from the tower that the watchman caught the first glimpse of home-coming war vessels. In modern times the watchman no longer scanned the horizon for vessels, but kept a lookout upon the city for fires.

The campanile served other purposes as well. It was also used for the purpose which its name signifies. According to some authorities, four

bells were hung in the olden days in the tower, to be sounded for different purposes. *La marangola* was sounded at dawn to call the laboring classes; *la sestamezzana* opened the official bureaux; *la trotterar* called the councils to duty; and the bell *del malfizio* tolled out the requiem for those who were to be put to death. A fifth bell was later brought from Candia, and tolled only on Ascension Day. In 1518 there hung halfway up the tower a wooden cage, in which prisoners were kept until they starved to death. Scientifically, the tower was of interest by reason of the fact that from it Galileo made many observations. On the morning of 14 July 1902, the campanile collapsed and fell with a great crash into the square. The church of St. Mark and the palace of the Doges were not hurt, but the campanile in falling carried away the Sansovino Loggetta and the library of the Royal Palace. Steps were taken at once to rebuild, and the corner-stone of the new edifice was laid on 24 April 1903. A study of the data provided by the examination of the remains of the fallen tower showed that the bricks had been used for various purposes at a previous stage, in arches, fortifications, tops of walls, etc. The most important fact was that they were not Venetian, but Roman bricks. Moreover, when they were manufactured, they were not manipulated like modern bricks, but formed from slices of clay, as they were found without the natural layers being disturbed. This process resulted in each individual brick being able to support a weight quite four times as great as the modern brick. The bricks examined are of the first century. One bore the impression of a horseshoe, proving the debated point that horseshoes were then in use.

Campanini, kām-pā-nē'nē, **Italo**, Italian singer: b. Parma, 29 June 1846; d. 23 Nov. 1896. His father was a blacksmith. At 14 the boy enlisted in Garibaldi's army and served in two campaigns, after which he worked at his father's trade until the age of 18. Meanwhile, having shown that he possessed an excellent voice, he had taken singing lessons, and after spending a year at the Conservatory in Parma, he appeared in that city as the notary in 'La Sonnambula,' but suffered failure and ridicule. He still continued to sing in public, and in 1869 began to study under Lamperti, a celebrated teacher of Milan. In that city, at La Scala, he sang in 'Faust,' and immediately was acclaimed a great tenor. He appeared in London in 1872, and in the following year made his first visit to the United States, appearing with Nilsson at the Academy of Music, New York, in 'Lucrezia Borgia.' Afterward, in this country and Europe, he sang with great success, and was regarded as the foremost tenor of his time. The partial failure of his voice, mainly through an affection of the throat, caused some interruption of his career, but scarcely diminished his popularity until near the close of his life.

Campan'ula, **Bell Flower**, or **Bellwort**, a genus of mostly annual, biennial, and perennial herbs of the natural order *Campanulaceæ*. The species, of which there are about 300, are almost all natives of the cooler parts of the northern temperate zone, and among them are some of the most widely grown garden plants which are popular on account of their bell-shaped blue, violet, or white flowers, and the ease with which

they can be cultivated. They do best in a rich, well-drained garden soil, and are readily propagated, the annual and biennial kinds from seeds, and the perennial either from seeds or by division or cuttings. All are hardy. A few species were formerly used in medicine, but are now considered inert. For a list of species and for details of cultivation consult Bailey and Miller, 'Cyclopædia of American Horticulture.'

Campanula'ceæ, a natural order of herbaceous and shrubby plants, generally abounding in a bitter, white juice. Their leaves are alternate and entire, rarely opposite. Their flowers form spikes, thyrsi, or heads. They have a monosepalous calyx, with four, five, or eight persistent divisions, and a regular or irregular monopetalous bell-shaped corolla, having its limb divided into as many lobes as there are divisions in the calyx. The stamens are five in number, the anthers free, or brought together in the form of a tube. The ovary is inferior or semi-inferior, with two or more cells, each containing numerous seeds. The style is simple, terminated by a lobed stigma, sometimes surrounded by hairs. The fruit is a capsule crowned by the limb of the calyx, with two or more cells opening either by means of holes which are formed near the upper part, or by incomplete valves. The seeds are very small and very numerous. These plants are chiefly natives of the temperate and colder climates of the northern hemisphere.

Campanula'rians, or **Sertula'rians**, hydroids of the order *Campanularia*. They are always colonial and possess hydrothecæ, and in most cases give rise to a medusa, with auditory organs on the flaps. The ectoderm is protected by a horny or chitinous sheath (perisarc) enveloping the zooids. The hydroids retract, when disturbed, into small cells (hydrothecæ), arranged in opposite rows on the stalk as in *Sertularia*, or singly at the ends of the stalks, as in *Campanularia*, while the sheaths (gonothecæ) protecting the medusa-buds are distinguished by their much larger size and cup-shaped form. The Sertularians abound on seaweeds, and may be recognized from their resemblance to mosses. The medusæ of these and many other hydroids can be collected by a towing-net, and emptied into a jar, where they can be detected by the naked eye after a little practice. It is possible that the extinct palæozoic group, *Graptolites*, belong near the Campanularians, as they have a similar perisarc composed of cells (hydrothecæ). Consult: A. Agassiz, 'North American Acalephæ' (Illustrated Catalogue of the Museum of Comparative Zoology at Harvard College, No. 2, Cambridge 1865); E. C. and A. Agassiz, 'Seaside Studies in Natural History' (Boston 1871); Nutting, 'American Hydroids' ('Special Bulletin of the U. S. National Museum': Washington 1900), contains a full bibliography.

Campardon, **Emile**, ā-mēl kân-pār-dôn, French writer: b. Paris, 1834. He was educated at the Ecole des Chartes, and then had charge of the archives there. In this position he had opportunity to examine the documents relating to the 18th century and the period of the French Revolution. He has written: 'History of the Revolutionary Tribunal of Paris' (1861); 'Marie Antoinette at the Conciergerie' (1862);

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'Madame Pompadour and the Court of Louis XV.' (1867); 'Unpublished Documents of J. B. Poquelin Molière'; 'Voltaire, Unpublished Documents'; 'The Royal Academy of Music in the 18th Century'; and 'Memoirs of Frederic II., King of Prussia' (with E. Boutaric).

Campbell, kām'bēl, Alexander, American clergyman: b. near Ballymena, County Antrim, Ireland, 12 Sept. 1788; d. Bethany, W. Va., 4 March 1866. He emigrated to the United States in 1807. He was originally a Presbyterian, but withdrew from that Church in 1812, and received baptism by immersion the same year. In connection with his father, Thomas Campbell, he formed several congregations, which united with a Baptist association, but protested against all human creeds as a bond of union, accepting the Bible alone as the rule of faith and practice. He met with much opposition in the assertion of this principle, and in 1827 was excluded from the fellowship of the Baptist churches. Certain vaguely defined expressions in his writings have been interpreted as implying a belief in baptismal regeneration, a doctrine which the Disciples repudiate. By his discussions on public platforms, and his serial publications, the 'Christian Baptist,' and the 'Millennial Harbinger,' as well as by his assiduity in preaching tours and in training young men for the ministry, Campbell gradually formed a large party of followers, who began about 1827 to form themselves into a sect under the designation of "The Disciples of Christ" (q.v.), but who are most commonly known as Campbellites. In 1841 Campbell founded Bethany College in West Virginia (q.v.). His writings were numerous, and among them are 'The Christian System'; and 'Remission of Sin'. Consult: Richardson, 'Mémorial of Alexander Campbell' (1868).

Campbell, Alexander, American politician: b. Concord, Pa., 4 Oct. 1814; d. La Salle, Ill., 9 Aug. 1898. He received a common-school education and entered the iron business, removing to Illinois and attaining prominence in local politics. He was mayor of La Salle, Ill., in 1852, a member of the Illinois legislature in 1858 and a member of Congress in 1875. He was widely known as the "father of the Green-back party."

Campbell, Sir Alexander, Canadian statesman: b. Yorkshire, England, 9 March 1822; d. Toronto, 24 May 1892. He began the practice of law in 1843, and in 1856 became queen's counsel. In 1858 he entered the legislative council, and in 1862 was elected speaker. In 1864-7 he was commissioner of Crown Lands. He was a member of the Quebec Conference in 1864, received an appointment to the Dominion senate (1867), where he was the government leader; became a member of the Queen's Privy Council in 1897, and was postmaster-general in Sir John Macdonald's first federal cabinet. In 1873 he became minister of the interior. With the other cabinet officers, he resigned in the same year, because of the Pacific Railroad scandal. On the return of Macdonald to power, he was minister of militia and defense and again postmaster-general. In 1881 he was minister of justice, and in 1887 lieutenant-governor of Ontario. In politics he was a Conservative, and represented Canada in the imperial federation conference held at London in 1887.

Campbell, Allan, American civil engineer: b. Albany, N. Y., 1815; d. New York, 18 March 1894. He laid out the route of the New York and Harlem R.R.; built a railroad from Callao to Lima, Peru (1855); was appointed engineer of the harbor defenses of New York in the early part of the Civil War; was chief engineer in the construction of the Union P. R.R. He superintended the Harlem R.R. improvement, and became commissioner of public works in New York (1876).

Campbell, Archibald (8th EARL and 1st MARQUIS OF ARGYLE): b. 1598; d. 1661. He was a zealous partisan of the Covenanters. Charles I. created him a marquis in 1641, notwithstanding the opposition he had shown to his favorite object of effecting a conformity between the churches of Scotland and England. It was by his persuasion that Charles II. visited Scotland, and was crowned at Scone in 1651. At the Restoration he was confined in the Tower for five months, and was then sent to Scotland, where he was tried for high treason in connection with the death of Charles I., and beheaded.

Campbell, Archibald (9th EARL OF ARGYLE): d. 30 June 1685. He was the son of the 8th Earl of Argyle, and served the king with great bravery at the battle of Dunbar, and was excluded from the general pardon by Cromwell in 1654, for his exertions in favor of the royal cause. He was afterward made a privy-councilor and one of the lords of the treasury. For refusal to take contradictory oaths, he was tried for treason, and condemned to death, but escaped to Holland, whence he returned with several other disaffected persons, and landed in the Highlands with a view of aiding the insurrection of the Duke of Monmouth. The plan, however, failed; and he was taken by some country people, who conveyed him to Edinburgh, where he was beheaded.

Campbell, Bartley, American dramatist: b. Allegheny City, Pa., 12 Aug. 1843; d. Middletown, N. Y., 30 July 1888. He engaged in journalism early in his career and established the *Evening Mail* in Pittsburg (1868) and the 'Southern Magazine' in New Orleans (1869). His first drama that met with success in New York was 'My Partner,' appearing in 1879. 'Fairfax, or Life in the Sunny South,' and 'The Galley Slave,' were on the metropolitan boards during the same season. Included in his plays are: 'Matrimony'; 'The White Slave'; 'Siberia'; and 'Paquita.' Several of his plays were brought out in England.

Campbell, Beatrice Stella Tanner (MRS. PATRICK CAMPBELL), English actress: b. London, 1867; married in 1884 Patrick Campbell, killed in 1900 in the Boer war. Her first appearance on the professional stage was made in 1888 at the Alexandra Theatre in Liverpool. She has been particularly successful in such plays as 'The Second Mrs. Tanqueray,' 'John-a-Dreams,' and 'The Notorious Mrs. Ebbsmith.' She has also appeared in such Shakespearean roles as Juliet, Ophelia, and Lady Macbeth. She has frequently visited the United States, playing in most of the leading cities.

Campbell, Charles, American historian: b. Petersburg, Va., 1 May 1807; d. Staunton, Va., 11 July 1876. His life was mainly spent in teaching in his native city. Among his publica-

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tions are: 'The Bland Papers' (1840-3); 'An Introduction to the History of the Colony and Ancient Dominion of Virginia' (1849); 'Genealogy of the Spotswood Family' (1868). He belonged to the Historical Society of Virginia; was a contributor of the 'Historical Register' and the 'Southern Literary Messenger'; and editor of the 'Orderly Book' of Gen. Andrew Lewis in 1776 (1860).

Campbell, Sir Colin (LORD CLYDE), general: b. Glasgow, 20 Oct. 1792; d. 14 Aug. 1863. His father was a carpenter, named MacIver, but the son assumed the name of Campbell. Entering the army in 1808, and serving in the Peninsular war (1809-14), he was severely wounded at the siege of San Sebastian and the passage of the Bidassoa. He took part in the expedition to the United States (1814), and then passed nearly 30 years in garrison duty at Gibraltar, Barbados, Demerara, and various places in England, in 1837 becoming lieutenant-colonel of the 98th foot. He served in India previous to the Crimean war, on the outbreak of which, in 1854, he was appointed to the command of the Highland brigade. The victory of the Alma was mainly his; and his, too, the splendid repulse of the Russians by the "thin red line" in the battle of Balaklava. When, on 11 July 1857, the news reached England of the Sepoy mutiny, Lord Palmerston offered him the command of the forces in India. He effected the final relief of Lucknow, and on 20 Dec. 1858, having five months earlier been created Baron Clyde, announced to the viceroy that the rebellion was ended. Returning next year to England, he was made a field-marshal, and received an annuity of £2,000.

Campbell, Colin, Scottish clergyman: b. Campbelltown, Argyshire, 1848. He was educated at the universities of Edinburgh and Heidelberg, entered the ministry of the Established Kirk of Scotland, and has been minister of the parish of Dundee from 1882. He preached nearly every year from 1883 to 1900 before Queen Victoria at Balmoral Castle and Craithie Parish Church, and has published 'The First Three Gospels in Greek'; 'Critical Studies in St. Luke's Gospel' (1891).

Campbell, Lady Colin, English writer. She is a daughter of Edmond Blood of County Clare, Ireland, and was married to Lord Colin Campbell, youngest son of the 8th Duke of Argyll. She became a widow in 1895. Besides many contributions to journalism, she has published 'Darell Blake'; 'A Book of the Running Brook'; 'A Miracle in Rabbits.'

Campbell, Douglas, American lawyer and writer, son of W. W. Campbell (q.v.): b. Cooperstown, N. Y., 13 July 1840; d. Schenectady, N. Y., 7 March 1893. He practised law in New York (1865-90), but devoted his latest years to historical research. He was the author of 'The Puritan in Holland, England, and America' (1892), which has been widely read.

Campbell, Douglas Houghton, American educator: b. Detroit, Mich., 16 Dec. 1859. He was graduated at the University of Michigan in 1882, and then studied in Europe for four years. Returning he was professor of botany in the University of Indiana till 1891, when he was called to the similar chair in Stanford University. He is author of 'Elements of Structural and Systematic Botany'; 'Structure and

Development of Mosses and Ferns'; and 'Lectures on Evolution of Plants.'

Campbell, George, Scottish clergyman: b. Aberdeen, 25 Dec. 1719; d. 6 April 1796. He was educated at Marischal College, and afterward articulated to a writer of the signet at Edinburgh. In 1741 he relinquished the law and studied divinity. In 1759 he was appointed principal of Marischal College. In 1763 he published his celebrated 'Dissertation on Miracles,' in answer to Hume's essay. In 1771 he was chosen professor of divinity, and in 1776 gave to the world his 'Philosophy of Rhetoric,' which established his reputation as a grammarian and critic.

Campbell, Sir George, English statesman: b. 1824; d. London, 18 Feb. 1892. He was educated at Haileyburg for the East Indian service and held several important posts under the Indian government, serving several terms in Parliament also. He published: 'Modern India' (1852); 'India as It May Be'; 'Handy Book of the Eastern Question' (1876); 'White and Black in the United States'; 'The British Empire' (1889).

Campbell, Harry, English physician: b. Margaretting, Essex, England. He studied medicine at Saint Bartholomew's Hospital College and was appointed to the staff of North-west London Hospital, 1886, and that of Welbeck Street Hospital, 1896. He has published: 'The Physiology of Eyesight' (1885); 'The Causation of Disease' (1889); 'Flushing and Morbid Blushing' (1890); 'Differences in the Nervous Organization of Man and Woman' (1891); 'Headache and Other Morbid Cephalic Sensations' (1894); 'Respiratory Exercises in the Treatment of Disease' (1898).

Campbell, Helen Stuart, American author. b. Lockport, N. Y., 4 July 1839. She was educated at Mrs. Cook's Seminary, Bloomfield, N. J., 1850-8, and very early began contributing to periodicals. From 1881 to 1884 she edited 'Our Continent' (Philadelphia). Her especial interest has been in social and domestic questions, such as the condition of the poor, household management, etc., and her writings for the most part consists of essays and stories illustrating these topics. Chief among them are: 'The Ainslee Series' (1864-7); 'Six Sinners' (1878); 'Unto the Third and Fourth Generation' (1880); 'Under Green Apple Boughs' (1881); 'The Easiest Way in Housekeeping and Cooking' (1881); 'The Problem of the Poor' (1882); 'Mrs. Herndon's Income: a Novel' (1885); 'Prisoners of Poverty' (1887); 'Prisoners of Poverty Abroad' (1889); 'Roger Berkeley's Probation' (1891); 'Anne Bradstreet and Her Time' (1892); 'Women Wage-Earners' (1893); 'In Foreign Kitchens' (1894); 'Some Passages in the Practice of Dr. Martha Scarborough' (1893); 'Ballantyne: a Novel' (1901).

Campbell, Henry Donald, American scientist: b. Lexington, Va., 29 July 1862. He was graduated at Washington and Lee University in 1882; later studied at Berlin and Heidelberg, and in 1887 became professor of geology and biology at Washington and Lee University.

Campbell, James Edwin, American politician: b. Middletown, Ohio, 7 July 1843. After an academic education he was admitted to the

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bar. During the Civil War he served for a time in the navy and was with the Mississippi and Red River flotillas. He was a Democratic member of Congress, 1883-9; governor of Ohio, 1800-2. He was defeated for re-election by William McKinley, afterward President of the United States. In 1895 he was again a candidate, but was defeated by A. S. Bushnell. His home is at Hamilton, Ohio, where he has a successful law practice.

Campbell, James M., Scottish-American clergyman: b. Scotland, 5 May 1840. He received his education at the universities of Edinburgh and Glasgow and in 1874 came to the United States. He has lectured much on religious themes and has published: 'Unto the Uttermost' (1889); 'The Indwelling Christ' (1895); 'After Pentecost, What?' (1897); 'The Teachings of the Books' (1899); 'Clerical Types' (1900); 'Bible Questions' (1900).

Campbell, James Valentine, American jurist: b. Buffalo, N. Y., 25 Feb. 1823; d. Detroit, Mich., 26 March 1890. When three years old he accompanied his parents to Detroit. He graduated at St. Paul's College, L. I., in 1841; was admitted to the Detroit bar, 1844; practised with success until 1857. He was then elected a judge of the supreme court of Michigan, re-elected at every succeeding election, and was chosen chief justice for nine terms in succession. From 1859 he lectured for 20 years in the law department of the University of Michigan. Much of his leisure was devoted to literary and historical studies, especially the history of Michigan and the northwest territory. Until 1854 he was a Whig, but thereafter acted chiefly with the Republicans. He wrote 'Outlines of the Political History of Michigan' (1876).

Campbell, John, American editor: b. Scotland, 1653; d. 4 March 1728. He was one of a family or kin of Boston booksellers and public officials whose relationships are not determinable, but which included John, in the middle of the 17th century, Duncan, postmaster of Boston from 1604 on, and John (above), who was appointed postmaster—probably succeeding Duncan—in the latter part of 1702. There seems to have been a Thomas also about this time. The later John as postmaster was the news centre of the New England provinces; and in 1703 was writing "news letters" of European news to Gov. Winthrop of Connecticut, and perhaps other governors, made up of information received from arriving travelers, etc., with inferences as to New England policy. In 1704 he concluded to make these public and for sale; and on 24 April issued the first newspaper in America, the *Boston News Letter* (q.v.), which he edited till 1722. In 1719 he was deprived of the postmastership. He was justice of the peace for Suffolk County for some years.

Campbell, John (2d DUKE OF ARGYLE and DUKE OF GREENWICH), British general and statesman: b. Scotland, 1678; d. 1743. In 1706 he served under the Duke of Marlborough, and was a brigadier-general at the battle of Ramilies. He was a promoter of the union, for which he incurred considerable odium in his own country. He commanded at the battles of Oudenarde and Malplaquet, and assisted at the sieges of Lisle and Ghent. For these ser-

vices he was made a Knight of the Garter in 1710, and the year following was sent as ambassador to Charles III. of Spain. He was also appointed commander-in-chief of the English forces there. In 1712 he had the military command in Scotland, of which post he was soon after deprived for opposing the court measures; but on the accession of George I. he was restored, and received additional honors. In 1715 he engaged the Earl of Mar's army at Dunblane, and forced the Pretender to quit the kingdom. In 1718 he was created an English peer with the title of Duke of Greenwich. He filled successively several high offices, of which he was deprived for his opposition to Sir Robert Walpole, but on the removal of that minister he was replaced. In Westminster Abbey, where he was buried, is a noble monument to his memory.

Campbell, John, British historian: b. Edinburgh, 8 March 1708; d. 28 Dec. 1775. His writings before 1742 were published anonymously. From 1755 to the close of his life he was agent of the British government for the province of Georgia. Among his works are: 'A Concise History of Spanish America' (1741); 'Lives of the English Admirals' (1744); 'A Survey of the Present State of Europe' (1750); and 'Trade of Great Britain to America' (1772).

Campbell, John (BARON), lord high chancellor of England: b. Springfield, near Cupar, county of Fife, Scotland, 15 Sept. 1779; d. 23 June 1861. He was educated at the grammar school of Cupar, and at 12 entered the University of St. Andrews (1791) for the purpose of studying for the Church. After remaining, however, for some years at college, he resolved to abandon the clerical profession, and determined to try his fortune in London. In 1798 he quitted his native country for the metropolis, where he became reporter and theatrical critic on the *Morning Chronicle*. In November 1800 he entered as a student of Lincoln's Inn, and in 1806 was called to the bar. He traveled the Oxford circuit, and obtained considerable practice. In 1830 he was elected member of Parliament for Stafford, and in 1832 was appointed solicitor-general. In 1834, on the retirement of Sir William Horne, he became attorney-general, and the same year was elected one of the members of Parliament for the city of Edinburgh, serving till 1841, when he was created chancellor of Ireland, and raised to the peerage as Baron Campbell of St. Andrews. He had scarcely, however, assumed his official duties in Ireland when he quitted office with the Melbourne ministry; and having now more leisure worked on his 'Lives of the Chancellors,' the first series of which was published early in 1846. On the accession of Lord John Russell to power in that year Lord Campbell accepted the chancellorship of the Duchy of Lancaster, but still continued his literary labors, completing, in seven volumes, his 'Lives of the Chancellors,' and adding two other supplemental volumes, entitled 'Lives of the Chief Justices of England.' In 1850, on the retirement of Lord Denman, he was appointed chief justice; in 1859, on Lord Palmerston's resumption of the premiership, Lord Campbell reached the highest legal dignity in the British empire, being raised to the woolsack as lord high chancellor.

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Campbell, John, Canadian Presbyterian clergyman: b. Edinburgh, Scotland, 18 June 1840. He was educated in the University of Toronto, and New College, Edinburgh, and in 1868 became pastor of the Charles Street Church in Toronto. In 1873 he was appointed professor of Church history and apologetics in the Presbyterian College, Montreal. Twenty years later he was convicted of heresy by the Montreal Presbytery, but the decision was reversed by the synod. He has published 'The Hittites: Their Inscriptions and Their History' (1890).

Campbell, John Archibald, American lawyer: b. Washington, Ga., 24 June 1811; d. Baltimore, 12 March 1889. He was graduated from the Georgia University in 1826 and was admitted to the bar in 1829 before coming of age, by virtue of a special act of the legislature. Removing to Alabama he soon became prominent in his profession, and in 1853 was appointed associate justice of the supreme court of the United States, resigning in 1861. He was subsequently appointed Confederate secretary of war, and was one of the commissioners named by President Davis to meet President Lincoln and Secretary Seward at the conference in Fortress Monroe in February 1865. He was imprisoned for some months after the close of the Civil War and on his release resumed his legal practice.

Campbell, John Douglas Sutherland. See ARGYLE, CAMPBELLS OF.

Campbell, John Francis, Scotch folklore writer: b. 29 Dec. 1822; d. Cannes, France, 17 Feb. 1885. His first success was 'Popular Tales of the West Highlands' (1860-2), an accurate and discriminating compilation; to which succeeded 'Frost and Fire' (1865).

Campbell, John Lorne, American Baptist clergyman: b. Dominionville, Ontario, 14 Jan. 1845. He was graduated from Woodstock College, Ontario, and from the Baptist Theological Seminary of the same institution, and subsequently from Toronto University. He was ordained to the Baptist ministry in 1868. Since 1889 he has been pastor of the Lexington Avenue Baptist Church in New York. He has published 'Heavenly Recognition and Other Sermons' (1895); 'Sanctification' (1901).

Campbell, John McLeod, Scotch theologian: b. Kilniver, Argyle, 4 May 1800; d. 27 Feb. 1872. Sent to Glasgow University at 11, he was licensed to preach by the presbytery of Lorne in 1821. His views on salvation and the atonement brought upon him a charge of heresy, which led to his deposition in 1831. For years he labored in the Highlands and preached without remuneration. When his health broke down he advised his people to attach themselves to the church of Norman Macleod. He spent the remainder of his life in retirement. In 1868 his university gave him the degree of D.D., and in 1871 a testimonial and address was presented to him by men of nearly every religious denomination in Scotland. He wrote: 'Christ the Bread of Life' (1851); 'The Nature of the Atonement' (1856); and 'Thoughts on Revelation' (1862).

Campbell, John Pendleton, American scientist: b. Cumberland, Md., 20 Nov. 1863. He studied at Johns Hopkins University, and in 1888 became professor of biology at the University of Georgia.

Campbell, John Preston, American lawyer and author: b. Boston, Mass., 8 April 1849. He practised law at Abilene, Kansas, but since 1897 has lived in Washington, D. C. Among his numerous writings are: 'Merl of Medevon and Other Prose Writings' (1888); 'My Mate Immortal'; and 'Queen Sylvia and Other Poems' (1886).

Campbell, John TenBrook, American scientist: b. Montezuma, Ind., 21 May 1833. A carpenter in early life, he enlisted as a private at the outbreak of the Civil War, and rose to the rank of captain. He studied engineering and physical science, and has perfected many surveying implements. He has written 'National Finances,' and pamphlets on mathematical science and astro-physics.

Campbell, Lewis, British classical scholar: b. Edinburgh, 3 Sept. 1830. He received his early education at Edinburgh Academy, and afterward attended the University of Glasgow, and Trinity and Balliol colleges, Oxford, taking the degree of B.A. (with first-class honors in classics) in 1853, and that of M.A. in 1856. Ordained in 1857, he became vicar of Milford, Hants, in the following year, a post which he held till his appointment, in 1863, as professor of Greek in St. Andrew's University. He retired from this chair in 1892, becoming emeritus professor. The 1894-5 series of Gifford Lectures at St. Andrews was delivered by him. As a writer he is known mainly by his editions and translations of ancient Greek authors, the chief of which are: Plato's 'Theætetus' (1861); Plato's 'Sophistes and Politicus' (1867); 'Sophocles—The Plays and Fragments' (1879); 'Sophocles in English Verse' (1873-83); 'Æschylus in English Verse' (1890); and Plato's 'Republic' (with the late Benjamin Jowett 1894). 'The Christian Ideal,' published in 1877, is a volume of sermons; and his other works include a 'Guide to Greek Tragedy' (1891); 'Life of James Clerk Maxwell' (with W. Garnett 1882); 'Life of Benjamin Jowett' (with E. Abbott 1897); 'Religion in Greek Literature' (1898), the substance of his Gifford Lectures; and the articles, 'Plato' and 'Sophocles' in the ninth edition of the 'Encyclopædia Britannica.'

Campbell, Loomis J., American philologist: b. Oneonta, N. Y., 1831; d. there, 6 Nov. 1896. He was author of a 'United States History,' also of the popular 'Franklin Series' of school books; and edited a 'Young Folks' Book of Poetry' and a 'Hand-Book of Synonyms.'

Campbell, Mrs. Patrick. See CAMPBELL, BEATRICE.

Campbell, Reginald John, English Congregational clergyman: b. London, 1867. After receiving a collegiate training at University College, Nottingham, and Christ Church College, Oxford, he entered the Congregational ministry in 1895. He is pastor of the Union Church, Brighton, and is widely known as a preacher. He has published 'The Making of an Apostle'; 'The Restored Innocence' (1898); 'A Faith for To-day' (1900).

Campbell, Thomas, British poet: b. Glasgow, 27 July 1777; d. Boulogne, France, 15 June 1844. He was educated at the University of Glasgow, where he distinguished himself by the excellence of his poetical translations from

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the Greek. After leaving the university he resided for a short time in Edinburgh; and all at once attained the zenith of his fame by publishing, in 1799, 'The Pleasures of Hope.' It produced an extraordinary sensation, and soon became a familiar book throughout the kingdom. This was due not more to the graces of its style than to the noble purity of its thoughts. After the publication of this he went to Germany, where he met Klopstock at Hamburg, and visited the scene of the battle celebrated in 'Hohenlinden,' one of the most famous of his poems. The appearance of the English fleet caused him to leave Altona, where he had resided for some time. During this tour several of his best lyrics were written or suggested, among them 'The Exile of Erin,' 'Ye Mariners of England,' and 'The Battle of the Baltic.' In 1803 a new edition of 'The Pleasures of Hope,' with other poems, appeared, and in that year he was married. Settling in London, he devoted himself to literary work, and in 1805 obtained a pension of £200, through the influence of Fox, of whose politics he was an admirer. After this he appears for a time to have given his attention less to poetry than prose, but in 1809 he again made his appearance as a poet, and published 'Gertrude of Wyoming,' which some eminent critics have considered superior to 'The Pleasures of Hope,' though the public appear to have judged differently. In 1814 he visited Paris, and in the following year he received a legacy of over £4,000. In 1819, by his 'Specimens of the British Poets,' accompanied with critical essays, he proved himself the possessor of great critical acumen and an admirable prose style. In 1820 he became editor of the 'New Monthly Magazine,' a position which he held till 1830. In 1824 he published 'Theodoric,' which, though not devoid of fine passages, scarcely sustained his reputation. For some years he took an active interest in the emancipation of Greece and Poland, and in the foundation of the London University, of which he considered himself the originator. He was lord rector of the University of Glasgow from 1826 to 1829. In 1828 his wife died, and thenceforth his vigor, both bodily and mental, began to decline; and though he afterward published 'Letters from the South' (1837), describing a visit which he had paid to Algiers, a 'Life of Mrs. Siddons' (1834-42), and a 'Life of Petrarch,' and either wrote or edited the 'Life and Times of Frederick the Great,' he failed to equal his more youthful efforts. In 1831-2 he was editor of the 'Metropolitan Magazine,' and in 1832 he founded the Polish Association. Among his works not mentioned above are: 'The Advent,' a hymn; 'Love and Madness'; 'Lord Ullin's Daughter'; 'The Wounded Hussar'; 'Gilderoy'; 'The Soldier's Dream'; 'Judith'; 'The Name Unknown'; 'The Turkish Lady'; 'Lochiel's Warning'; 'The Rainbow'; 'The Last Man'; 'Navarino'; 'Pilgrim of Glencoe'; 'Moonlight'; etc. See Beattie, 'Life and Letters of Thomas Campbell'; and Redding, 'Literary Reminiscences of Campbell.'

Campbell, Thomas W., American clergyman: b. Three Rivers, Quebec, Canada, 24 Sept. 1851. He was graduated at Victoria University in 1879, and became a Methodist missionary. Joining the Reformed Episcopal Church, he was elected a bishop in 1891, and presiding bishop

in 1894, and resigned to enter the Presbyterian Church in 1898. Since October 1899 he has been pastor of the Noble Street Church, Brooklyn, N. Y.

Campbell, William, American soldier: b. Augusta County, Va., 1745; d. Rocky Mills, Va., 22 Aug. 1781. He was of Scottish descent. Commissioned a captain in the first regular troops raised in Virginia in 1775, and later becoming a colonel of militia, he distinguished himself greatly in the battles of King's Mountain and Guilford Court-House. His military career was short but brilliant, and on all occasions marked by conspicuous bravery. Lafayette gave him the command of a brigade of riflemen and light infantry. Washington, Gates, and Greene, the Virginia legislature, and the Continental Congress expressed their high sense of his merits and services. He was taken fatally ill a few weeks before the siege of Yorktown. He married a sister of Patrick Henry.

Campbell, William (LORD), English royal governor of South Carolina: b. (?); d. 5 Sept. 1778. He was the youngest son of John, fourth Duke of Argyle. He received a captaincy in the British navy, 20 Aug. 1762; was a member of Parliament in 1764, and governor of Nova Scotia, 1766-73. In 1774 he was appointed governor of South Carolina, entered upon his duties in June 1775, was courteously received by the people, for whom he professed great friendship. The hollowness of his promises was soon proved, however, and finding his residence in Charleston unsafe, he fled on board a British man-of-war, where he was soon joined by his wife, who was a Miss Sarah Izard, sister of the patriot, Ralph Izard, who belonged to the wealthiest family in the province. In 1776 Campbell served as a volunteer on board Sir Peter Parker's flagship, Bristol, in the attack on Fort Sullivan, 28 June, and was severely wounded early in the action, while in command of the lower deck. He ultimately died from the effects of the wounds received at this time. Though not of a very firm character, he was possessed of a vigorous courage which frequently displayed itself.

Campbell, William W., American lawyer and historian: b. Cherry Valley, N. Y., 1806; d. there. 7 Sept. 1881. He settled in New York and was a judge of the State supreme court. He wrote 'Annals of Tryon County' (re-issued as 'Border Warfare'); 'Life and Writings of De Witt Clinton'; 'Sketches of Robin Hood and Capt. Kidd'; etc.

Campbell, William Wallace, American astronomer: b. Hancock County, Ohio, 11 April 1862. He was graduated from the University of Michigan in 1880; was professor of mathematics at the University of Colorado, 1886-8; and instructor in astronomy in the University of Michigan, 1888-91. Since 1891 he has been astronomer at the Lick Observatory, California, and acting director there from September 1900. He is a member of several American and foreign learned societies, and besides many professional papers has published 'The Elements of Practical Astronomy' (1899).

Campbell, William Wilfred, Canadian poet: b. Berlin, Ontario, Canada, 1 June 1861. He was educated at Toronto University, and the Episcopal Theological School, Cambridge, Mass.,

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and was for some years in the Episcopal ministry in Canada, retiring from it in 1891 in order to devote himself entirely to literary pursuits. He has published 'Lake Lyrics' (1889); 'The Dread Voyage' (1893); 'Mordred, a Tragedy'; and 'Hildebrand' (1895), the two latter being dramas in blank verse; 'Beyond the Hills of Dream' (1899); and numerous separate poems, among them 'England' (1897). He is cited, in the 'Victorian Anthology,' among the notable poets of Canada.

Campbell. See ARGYLE, CAMPBELLS OF.

Campbell-Ban'nerman, Sir Henry, English statesman: b. 7 Sept. 1836. He was the son of Sir James Campbell, but added the surname Bannerman, under the will of a maternal uncle. He was educated at Glasgow University and Trinity College, Cambridge. In 1868 he was elected member of Parliament for Stirling Borough. From 1871-4, and from 1880-2, he was financial secretary of the war office; 1882-4, secretary of admiralty; 1884-5, chief secretary for Ireland; 1886 and 1892-5, secretary for war. In February 1899 he became leader of the Liberal party in succession to Sir William Harcourt.

Campbell Island, a lonely island to the south of New Zealand, in lat. 52° 34' S., and lon. 169° 12' E. Though it rises to a height of 1,498 feet, and is only 85 square miles in area, it is yet valuable on account of its harbors. It is also scientifically interesting, being volcanic, and displaying a rich and rare flora. It served as an observatory during the transit of Venus in 1874.

Camp'bellites, followers of Rev. John McLeod Campbell, who was deposed from the Church of Scotland in 1831 for teaching the universality of the Atonement. He established a church at Glasgow in 1833. The name is also applied to members of the church founded in the United States by Alexander Campbell. See DISCIPLES OF CHRIST.

Campbell's Station, Tenn., the scene of an engagement between Federal and Confederate forces, 4 Nov. 1863. Gen. Braxton Bragg, who was besieging Chattanooga, detached Longstreet's corps of 10,000 men and 35 guns, with Wheeler's cavalry force of 5,000 men, to capture Burnside or drive him out of East Tennessee. Longstreet reached the south bank of the Tennessee, near Loudon, on the 13th, and that night and next day laid bridges at Huff's Ferry, two miles below Loudon, and began crossing his infantry. Burnside, who was holding the north bank of the river from Kingston to Lenoirs, concluded to leave one brigade at Kingston and retire the rest of his command to Knoxville, about 30 miles, where he had prepared to make a stand behind defensive works. He skirmished sharply with Longstreet's advance on the 14th, and gradually falling back on the 15th, at night concentrated Hartranft's and Ferrero's divisions of the 9th Corps, and White's of the 23d, at Lenoirs. He had about 5,000 men. Longstreet followed, attacked during the night, and was repulsed. Before daybreak of the 16th Hartranft, with his division and some cavalry, was put on the march to secure Campbell's Station, the intersection of roads coming from the south. After destroying many wagons and contents, taking the teams to

assist his artillery over the bad roads, axle-deep in mud, Burnside followed with the other two divisions, artillery and trains, closely pursued by Longstreet, with Hood's division, commanded by Gen. Micah Jenkins, with whose advance his rearguard had several sharp encounters. McLaws' division of Longstreet's corps took a more direct road to the left, the two roads intersecting about a mile southward of Campbell's Station, 15 miles south of Knoxville. Hartranft reached the coveted point in advance of McLaws and, turning west on the Kingston road, deployed his division in such manner as to confront McLaws, and at the same time cover the Lenoir road, along which the trains were moving in advance of the infantry. He had scarcely made his dispositions when McLaws appeared and attacked, but Hartranft held on until Burnside, with the trains and the remainder of the troops, had passed and the troops taken position, when he fell back and formed on the left of White's division, in position half a mile beyond the junction of the two roads. Ferrero's division on White's right, and the artillery on commanding ground sweeping the road and the open country in front. The jaded train continued on the road to Knoxville. McLaws advanced and drew up in the plain, but the forbidding aspect of Burnside's artillery, which opened viciously on him, forbade direct attack with infantry, whereupon he opened with artillery, and Longstreet ordered attacks upon both flanks of Burnside's line, which were made and nicely parried or repulsed; but, largely superior in numbers, Longstreet was able to move around both flanks, especially on Burnside's left, which obliged him to fall back to a ridge nearly a mile in the rear. This he did in a handsome manner, though under a heavy and constant fire, and closely pressed on all sides. It was four o'clock when Hood's division made an attack on Burnside's left, which was repulsed. McLaws attacked his right and was thrown back, and Longstreet then prepared for a general advance of his entire line; but before his preparations were completed it was coming dark, and his train secure and well on the way to Knoxville. Burnside, after dark, resumed his march. His advance reached Knoxville about daybreak next morning, 17 November, Longstreet warily following during the day, and the siege of Knoxville began. In this action at Campbell's Station and the skirmishes preceding it at Huff's Ferry, Lenoirs, and on the march, the Union loss was 303 killed and wounded, and 135 missing. The Confederate loss is not definitely known. Hood's division, the most seriously engaged, lost 174 killed and wounded; the loss of McLaws was much less. Consult: 'Official Records,' Vol. XXXV.; the Century Company's 'Battles and Leaders of the Civil War,' Vol. III.; Woodward's 'Burnside and the 9th Army Corps.'

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Campe, Joachim Heinrich, yō'āh-im hīn rīh kām'pē, German author: b. Deensen, Brunswick, Germany, 29 June 1746; d. 22 Oct. 1818. He studied for the Church, acted for some time as a teacher in various positions, and in 1786 was chosen by the government of Brunswick to superintend and reform the schools of that duchy. He became likewise the head of a school-book publishing house at Brunswick, and his own works, which were issued

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from it, contributed greatly to extend its reputation. These consist principally of educational works and books for youth, the most successful being 'Robinson the Younger,' an adaptation of Defoe's 'Robinson Crusoe.' This attained an immense popularity, being translated into almost all the languages of Europe. He also wrote a 'History of the Discovery of America.'

Campeche, or **Campeachy**, Mexico, a seaport town in the state and on the bay of the same name, on the west coast of the peninsula of Yucatan, about 100 miles southwest of Merida, with which it is connected by railroad. It contains a citadel, a university with a museum, a hospital, and a handsome theatre. Campeche is an important mart for logwood or Campeachy wood, of which great quantities are exported. Other important exports are wax, cigars, and henequen or sisal-hemp. Owing to the shallowness of the roadstead large vessels have to anchor five or six miles off. There is a lighthouse on the coast at this port. Pop. 10,631. The state of Campeachy has an area of 18,091 square miles. Pop. 84,000. The Bay of Campeachy, part of the Gulf of Mexico, lies on the southwest of the peninsula of Yucatan, and on the north of the province of Tabasco.

Campeggio, *kām-pěj'ō*, or **Campeggi**, **Lorenzo**, Italian ecclesiastic: b. Bologna, 1472; d. Rome, 19 July 1530. He succeeded his father as professor of law in the University of Padua in 1511, and gained a high reputation. When holding this office he married, and became the father of several children, but having lost his wife, took orders. Pope Julius II. made him bishop of Feltri, and Leo X., after giving him a cardinal's hat, employed him on several important missions, the execution of which gave him some prominence in connection with the Reformation. One of his missions was to Germany, for the purpose of regaining Luther; and another to England, to attempt to levy a tithe for defraying the expense of a war against the Turks. He failed signally in both, but ingratiated himself with Henry VIII., and was made bishop of Salisbury. Under Clement VII. he was sent as legate to the Diet of Nuremberg, where he vainly endeavored to unite the princes in opposition to Luther; and to the Diet of Augsburg. He again visited England, with extensive powers to decide in the question of divorce between Henry VIII. and Queen Catherine; but his temporizing measures lost him the confidence of all parties, as well as his bishopric of Salisbury. Notwithstanding his repeated failures, he remained high in favor at the papal court; and at his death was archbishop of Bologna.

Campen. See KAMPEN.

Campen, Jacob de. See KAMPEN, JACOB DE.

Campen, Jan van. See KAMPEN, JAN VAN.

Camper, Peter, *pā'tēr kām'pēr*, Dutch anatomist: b. Leyden, 11 May 1722; d. The Hague, 7 April 1789. He distinguished himself in anatomy, surgery, obstetrics, and medical jurisprudence, and also as a writer on æsthetics. From 1750 to 1755 he was professor of medicine at Franeker, and from the latter year to 1763 at Amsterdam. Henceforth till his resignation in 1773 he held a professorship at Groningen. His 'Dissertation on the Natural Varieties,' etc., is the first work in which was thrown

much light on the varieties of the human species, which the author distinguishes by the shape of the skull. His 'Treatise on the Natural Difference of Features in Persons of Various Countries and Ages,' and one on 'Beauty as Exhibited in Ancient Paintings and Engravings,' followed by a method of delineating various sorts of heads with accuracy, is intended to prove that the rules laid down by the most celebrated limners and painters are very defective. His general doctrine is, that the difference in form and cast of countenance proceeds from the facial angle.

Camperdown (Dutch, *Camperduin*), Holland, a stretch of sandy hills or downs in the province of North Holland, between the North Sea and the small village of Camp, off which the British, under Admiral Duncan, gained a hard-won victory over the Dutch, under De Winter, 11 Oct. 1797. For this victory Admiral Duncan was raised to the peerage as Viscount Duncan of Camperdown. His son became Earl of Camperdown, and this title still belongs to a descendant.

Campero, Narciso, *nār-thē'sō kām-pā'rō*, Bolivian statesman and soldier: b. Tojo (now in Argentina), 1815. He studied and traveled in Europe, and on his return entered the Bolivian army, and rose to the rank of brigadier-general. He was minister of war in 1872. After the overthrow of Hilarion Daza in 1880 he was chosen president of Bolivia. He commanded the combined forces of Peru and Bolivia in Tacna campaign, but was defeated at Tacna, 26 May 1880. Internally, his administration was quiet.

Camphausen, Wilhelm, *vīl'hēlm kām'p-how-zēn*, German painter: b. Dusseldorf, 8 Feb. 1818; d. Dusseldorf, 16 June 1885. He was from 1859 professor in the art academy there. He was specially famous for battle-pieces—scenes from Cromwell's battles, the Thirty Years' war, the wars of 1866 and 1870—and painted many notable portraits of soldiers and equestrian figures.

Cam'phene, or **Camphine'**, (1) a general name for those terpenes which are solid at ordinary temperatures (see TERPENE); (2) a purified form of turpentine, obtained by distilling that substance over quicklime in order to remove the resins that the crude product contains, and widely used as an illuminating oil before petroleum was available.

Cam'phol, a substance now better known as borneol (q.v.).

Cam'phor, a white, translucent, crystalline substance occurring in the wood and bark of the laurel-tree (*Camphora officinarum*, *Cinnamomum camphora*, or *Laurus camphora*), from which it is obtained by distillation with steam and subsequent sublimation. It has the chemical formula $C_{10}H_{16}O$, melts at 350° F., boils at 500° F., and sublimates to an appreciable extent at practically all temperatures. It has a strong, pleasant, characteristic odor, and a peculiar, cooling, aromatic taste. Its specific gravity is about 0.992, and it dissolves to a slight extent in water, and freely in alcohol or ether. Small shavings of it exhibit lively motions when thrown upon a water-surface that is absolutely free from oily matter. (See SURFACE TENSION.) It is familiar about the household, on account of its use for protecting furs and woollens from

CAMPHORIC ACID—CAMPO BASSO

the attacks of moths and other insects. It is also employed in the manufacture of celluloid and various explosives. The chemistry of camphor is very complicated, and numerous substances are known that resemble it closely, and yet differ from it in certain particulars. See BORNEOL.

Camphor'ic Acid, a substance crystallizing in colorless, needle-like, monoclinic crystals, and obtained by boiling camphor with concentrated nitric acid. It has the formula $C_{10}H_{16}O_4$, and a specific gravity of 1.19, and melts at about 370° F. It is almost insoluble in cold water, but is soluble in hot water, alcohol, and ether.

Camphuysen, Dirk Rafelsk, *dürk räffä ëlz kâmp'hoi zën*, Dutch painter, theologian, and poet: b. Gorkum, 1586; d. Dokkum, 9 July 1627. He lost his parents at an early age, and was left to the care of an elder brother; who, thinking that he observed in Rafelsk an inclination for painting, placed him as a pupil in the studio of the artist Govitz. He soon distinguished himself by his landscapes, which were generally of small size, but animated with huts, cattle, and human figures, and executed with a skill and delicacy to which no former Dutch painter had attained. His paintings are now very rare, for he abandoned his art to devote himself to theology, which was the reigning passion of the age. He embraced the doctrines of Arminius, and shared in the persecutions under which Arminianism then suffered. He was expelled from the curacy of Vleuten which he had previously obtained, became a fugitive from village to village, a prey to suffering and privation, and often regretted the canvas and brush which had erewhile opened to him so pleasant a career. He found now in writing short poems his only relief and consolation. These are generally upon religious subjects, and are characterized by a remarkable depth of feeling.

Campi, *kâm'pë*, a family of Italian artists who founded what is known in painting as the school of Cremona. Of the four of this name, Giulio, Antonio, Vincenzo, and Bernardino, the first and the last are the best known. Giulio (1502-72), the eldest and the teacher of the others, was a pupil of Giulio Romano, and acquired from the study of Titian and Pordenone a skill in coloring which gave the school its high place. Bernardino (1525-90), was the greatest of the school. He took Romano, Titian, and Correggio in succession as his models, but without losing his own individuality as an artist.

Campion, Edmund, English theologian: b. London, 25 Jan. 1540; d. 1 Dec. 1581. He was educated at Christ's Hospital and St. John's College, Oxford, and distinguished himself greatly, becoming B.A. in 1561 and M.A. in 1564. Though at first a Roman Catholic he adopted nominally the Reformed faith and took deacon's orders in the Church of England. When Queen Elizabeth visited Oxford in 1566 he was selected to make the oration before her, as formerly while at school he had been chosen to deliver an oration before Queen Mary on her accession. He went from college to Ireland, and while there wrote the history of that country and connected himself with the Roman Catholic Church. His enthusiasm leading him to seek to make proselytes to his new faith, he was seized and imprisoned; but after a short time effected his escape to the Low Countries, and soon after

joined the English college of Jesuits at Douay, passed his novitiate as a member of that society, and became distinguished for his piety and learning. At Rome in 1573 he was admitted a member of the Order of Jesuits, after which he resided for a time at Vienna, where he composed a tragedy, which was received with much applause and acted before the emperor; and at Prague, where he taught rhetoric and philosophy for six years. Sent by Gregory XIII. on a mission to England in 1581, he challenged the universities and clergy to dispute with him. His efforts were followed by so large a number of conversions as to disquiet the ministry of Elizabeth; and he was arrested and thrown into the Tower upon a charge of having excited the people to rebellion, and of holding treasonable correspondence with foreign powers. Being tried, he was found guilty, condemned to death for high treason, and executed at Tyburn. The insults of the populace attended him to the Tower, where torture was fruitlessly applied to extort from him a confession of treason or a recognition of the supremacy of the English Church, and after his death a fragment of his body was sent to each of the principal towns for exposure. Beside his history of Ireland, he wrote 'Decem Rationes' ('Ten Reasons'), and compiled a 'Universal Chronology,' and collections of his letters and several essays were published after his death. His biography has been written by Richard Simpson (London 1867).

Campion, Thomas, English poet: b. about 1575; d. London, 1 March 1619. He was a physician by profession. He wrote a volume of 'Poems' (1595), being Latin elegies and epigrams. He published (1610-12) four 'Books of Airs,' containing songs written by himself to airs of his own composition: the first book contains 'Divine and Moral Songs'; the second, 'Light Conceits of Lovers'; the third and fourth are not distinguished by any separate sub-title. In his songs the verse and the music are most happily wedded.

Campli, Italy, a town in Naples, in the province of Teramo, and five miles north of the town of Teramo. It has a cathedral, three churches, an abbey, several convents, a hospital, and a mont-de-piété. Pop. 7,236.

Campo Basso, Niccolo, (CONTE DA), Italian soldier: fl. in the latter half of the 15th century. He had first supported the house of Anjou in the kingdom of Naples, but afterward transferred his services to their opponent, Charles the Bold, Duke of Burgundy. By pandering to the prejudices and caprices of that headstrong prince he acquired great influence over his mind, and in the end availed himself of the confidence placed in him by the Duke to sell him to his enemies. While the Duke was engaged in the siege of Nancy, in 1477, on the approach of a superior force under Ferrand, Duke of Lorraine, to relieve the place, Campo Basso deserted to the enemy immediately before battle. The Burgundians were in consequence defeated, and the Duke himself slain. The treacherous Italian was supposed to be the murderer, as the bodies of some of his men were observed near the spot where the unfortunate prince was found killed and stripped the day after the battle.

CAMPO-FORMIO — CAMPOMANES

Campo-Formio, Italy, a town 66 miles northeast of Venice, famous for the treaty of peace between Austria and France which was signed in its neighborhood, 17 Oct. 1797. Its chief provisions were that Austria should cede the Belgian provinces and Lombardy to France, receiving in compensation the Venetian states.

Campo Santo ("holy field"), the name given to a burying-ground in Italy, best known as the appellation of the more remarkable, such as are surrounded with arcades and richly adorned. The most famous Campo Santo is that of Pisa, which dates from the 12th century, and has on its walls frescoes of the 14th century of great interest in the history of art. Among more modern Italian cemeteries, that of Genoa is distinguished for its magnificence.

Campo Santo of Dissenters, Bunhill Fields burying-ground, in London; so named by Southey, and with good reason. Among those who lie buried there are John Bunyan; George Fox, the founder of the Quakers; Dr. Thomas Goodwin, who attended Cromwell on his death-bed; Dr. John Owen, who preached the first sermon before Parliament after Charles I. was executed; Susannah Wesley, the mother of John Wesley; Dr. Isaac Watts; William Blake, the painter and poet; Daniel De Foe, and Horne Tooke. On a remnant of land in the neighborhood the Friends have built a coffee tavern and memorial hall.

Campoamor y Campoosorio, *Ramon de*, ra mōn dā kām-pō-ā-mōr' ē kām-pō-ō-sō'rē-ō, Spanish poet; b. Navia, 24 Sept. 1817; d. 11 Feb. 1901. He studied medicine at Madrid for a time, but gave it up for literary work. He also entered political life, was governor of Alicante and Valencia and became state counselor under King Alfonso XII. in 1874. In politics he was a Conservative, and his views are expressed in 'Polémicas con la Democracia.' His chief work was in poetry, and he is considered one of the greatest Spanish poets of the 19th century; his attitude of thought is distinctively modern, and the interest of his best writings centres in modern life and problems. His best-known and most characteristic poems are the 'Doloras' (1856), a collection of short pieces which he himself defines as "dramas taken direct from life"; 'Los Pequeños Poemas' (1887), dealing with the "little things" of life; and the 'Humoradas' (1890), a collection of epigrams. He has written also two long narrative poems, 'Colon' (1853) in 16 cantos, and 'El Drama Universal,' and shorter narrative poems which are much more successful, among which are: 'Los Buenos y los Sabios'; 'El Amor y el Río Piedra'; 'El Trén Express'; 'La Nina y el Nido'; 'Los Grandes Problemas.' His latest poems are 'Licenciado Torralba' (1892); and

'Nuevos Poemas' (1892). He also wrote dramas, which did not prove successful on the stage. These include 'Dies Iræ' (1873); 'El Honor' (1874); and 'Cuerdos y Locos' (1887). Among his prose writings are 'La Filosofía de las Leyes' (1846); 'El Personalísimo' (1850); 'Lo absoluto' (1862), giving most fully his philosophical system; 'El Idealismo' (1883); and 'La Poética' (1883), summarizing his theory of poetry.

Campobas'so, Italy, the chief town of the province of Molise, on a hill-slope, 52 miles northeast of Naples. It is fortified, and is the seat of criminal and civil courts; has a collegiate church, four parish churches, several convents, two colleges, a hospital, and an almshouse. The cutlery manufactured here is said to be the best in Naples. The town is favorably placed for business on the road from the capital to the Adriatic. Two fairs are held annually. Pop. about 15,000.

Campobel'lo, New Brunswick, an island, eight miles long, in Passamaquoddy Bay, Charlotte County. It is noted as a summer resort. Though copper and lead ores exist, the inhabitants are chiefly engaged in the herring, mackerel, and cod fisheries.

Campodea, a wingless insect of the order *Thysanura*. Owing to its very primitive features it has been regarded by Brauer and by Packard as being the form nearest related to the probable ancestor of all insects. It is a little white insect living under stones. The body is long and narrow, each thoracic segment equal in size, the antennæ long and narrow, while the body ends in two very large, slender, many-jointed appendages. It is very agile in its movements and might be mistaken for a young centipede (*Lithobius*). Though allied to the bristle-tail (*Lepisma*) it is still more primitive. The mouth-parts have undergone some degeneration, being partly withdrawn within the head. It has a pair of short vestigial legs on the first abdominal segment. This and other features suggest its origin from some form with several pairs of abdominal appendages, similar to *Scolopendrella*. It is a cosmopolitan, and this, as well as its structure, suggests that it is an ancient form which has persisted to the present time.

Campomanes, *Pedro Rodriguez*, pā'drō rō-drē'gāth kām-pō-ma'nēz (COUNT OF), Spanish politician and author; b. 1723; d. 1802. Among his numerous works are 'A Dissertation on the Templars'; another 'On the Commercial Antiquity of Carthage'; 'A Treatise on the Sources of Popular Industries'; and 'A Treatise on the Education of Artisans'; besides a sequel to the latter work, which treats of the causes of the decline of the arts in Spain.

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